660.5 v.20 pt.1

Single Copies 10¢
Subscription rate $3.50 per yr.
in U.S.A. and Mexico (U.S. money)
$4 in Canada
$5 in foreign countries
Trade Mark reg.
U.S. Pat. Off.
Members of
Audit Bureau
of Circulations and
Associated Business Papers, Inc.

NATIONAL PETROLEUM NEWS

Branch Offices:
LOS ANGELES
Petroleum Securities Building
TULSA
World Building
NEW YORK
342 Madison Avenue
HOUSTON
614 West Building
CHICAGO
35 Wacker Drive

Published by the National Petroleum Publishing Co., MAIN OFFICE - 1213 W. 3rd St., Cleveland, Ohio. Copyrighted 1927.

Vol. XX Cleveland, Ohio, January 4, 1928 No. 1

Heavy Oil Markets Better Maintained in Group 3 in 1927 Than Gasoline

By J. C. Chatfield
N. P. N. STAFF WRITER

TULSA, Jan. 2

MID-CONTINENT gasoline markets reached a new low level in 1927, according to the records of NATIONAL PETROLEUM NEWS. The price of spot gasoline fell to a new low figure for single sales toward the end of the year and the average spot market for the year likewise established a new low. Markets for heavy oils, however, failed to fall as far or as quickly as gasoline.

Previous to 1927, Mid-Continent gasoline markets reached their lowest point in the fall of 1923 when the flood of California gasoline invaded the Middle West as a result of overproduction on the Pacific Coast. In November, 1923, the average price of U. S. Motor gasoline was down to 6.34 cents per gallon in Group 3, according to National Petroleum News records. Due to good markets the early part of 1923 the average price for that year was 10.10 cents per gallon.

In 1924 gasoline did not fall as low as in 1923 but the competition of California gasoline kept prices relatively low all year. The year's average was 9.16 cents per gallon with the low month, October, showing an average of 6.97 cents per gallon. With higher crude prices in 1925 and 1926 U. S. Motor gasoline climbed above 10 cents per gallon on the average.

During 1927 U. S. Motor gasoline sold down to a low average of 6.015 cents per gallon in December and in nine months of the year the average price was not above 7 cents. The July average was 7.141 cents per gallon at the peak of demand. The average price for the year was 6.815 cents per gallon or 3.642 cents per gallon less than in 1926.

High gravity gasolines were hit even harder than U. S. Motor gasoline, because of the high gasoline content of the fresh light crude available, the lack of a consistent export demand and the overproduction of natural gasolines. The average price of 64-66, 375 end point gasoline in 1927 was 7.791 cents per gallon as compared with 11.977 cents per gallon in 1926, a fall of 4.186 cents per gallon.

NO acute shortage of kerosene developed in 1927 as in 1926 so prices for 41-43 water white failed to climb anywhere near the 10-cent peak reached as an average for May, 1926. Kerosene prices, however, were steady at 4.125 cents per gallon and above throughout the year, reaching a peak of 6.078 cents per gallon in February and bringing well above 5 cents in January and March. The average for the year was 4.703 cents per gallon as compared with 4.228 cents in 1922, 4.176 cents in 1923, 4.673 cents in 1924, 4.559 cents in 1925 and 7.35 cents in 1926. It will be observed that in only one year out of the past six have kerosene prices maintained a higher average than in 1927.

Refiners have improved the art of fractionation in recent years to the point that they can almost say like the casual drinker that they can take it or leave it alone. Many refiners make no kerosene at all and others only when markets are profitable. It is a notable fact that in 1927 41-43 kerosene brought 142.6 per cent of the price of 36 gravity crude oil at the well as compared with 147.0 per cent in 1926, when the big shortage developed and prices ran up almost to the level of gasoline.

Virtually the same remarks may be made about the stove distillate market. In 1927 the 38-40 straw distillate market was remarkably steady at 3.187 cents per gallon and upwards all year. Peak demand in January brought the market up to an average of 5.325 cents per gallon that month and the September price fell to only 3.187 cents per gallon.

THE average price for the year was 3.628 cents per gallon as compared with 4.846 cents per gallon in 1926. a fall of 1.218 cents per gallon. As compared with crude stove distillate brought 110 per cent of 36 gravity oil at the well in 1927 and only 96.92 per cent of crude in 1926.

In spite of largely increased stocks of gas oil in the Mid-Continent field the price of that commodity averaged

Seminole Production As 1927 Closed

TULSA, Jan. 3.—Seminole district was producing 352,950 barrels of oil as Old Man 1927 was passing from the picture. This production was made in the 24 hours ending on the morning of Dec. 31. For the 24 hours ending on the morning of Jan. 1 Seminole produced 333,760 barrels.

Comparative Average Spot Market Prices for Principal Refined Products

Quoted in Cents per Gallon (except Fuel Oil) Group 3, for 1926 and 1927. Based on weekly quotations as published in National Petroleum News

	64-66, 375 e.p. Gasoline		58-60 U. S. Motor Gasoline		41-43 W. W. Kerosene		38-40 Straw Distillate		32-36 Straw Gas Oil		24-26 Fuel Oil $ per Bbl.		
	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	1926	1927	
January	12.328	10.662	9.860	9.100	5.531	5.987	4.031	5.325	3.687	4.388	1.269	1.277	January
February	13.000	9.875	10.438	8.327	6.500	6.078	3.999	4.790	3.734	4.234	1.200	1.275	February
March	12.250	8.062	10.050	6.859	6.750	5.187	4.187	3.980	3.938	3.703	1.240	1.241	March
April	12.266	7.125	10.250	6.061	7.203	4.453	4.578	3.312	3.234	3.172	1.412	1.087	April
May	12.953	7.125	11.750	6.550	10.000	4.400	4.640	3.225	4.125	2.275	1.365	.928	May
June	12.413	7.469	11.550	6.797	8.038	4.125	4.525	3.219	4.000	2.685	1.262	.909	June
July	12.203	7.656	11.172	7.141	6.531	4.125	4.640	3.359	4.047	2.734	1.240	.903	July
August	11.963	7.263	11.138	6.587	8.625	4.125	5.350	3.275	4.287	2.600	1.375	.878	August
September	11.750	7.031	10.781	6.203	8.969	4.250	5.719	3.187	4.313	2.562	1.450	.863	September
October	11.078	7.113	9.953	6.118	7.141	4.613	5.734	3.238	4.313	2.562	1.381	.878	October
November	10.662	7.062	9.200	6.025	6.600	4.609	5.375	3.308	4.313	2.562	1.322	.819	November
December	10.859	7.044	9.344	6.015	6.312	4.484	5.373	3.313	4.484	2.531	1.297	.794	December
Average	11.977	7.791	10.457	6.815	7.350	4.103	4.846	3.628	4.040	3.042	1.318	.988	Average
Decrease from 1926		4.186		3.642		2.647		1.218		0.998		0.330	
Per cent Decrease		34.95		34.83		35.98		32.57		24.71		25.04	
Per cent Decrease in Posted Price of 36 Gravity Crude				34.05									

3.042 cents per gallon in 1927 as compared with 4.040 cents per gallon in 1926. Due to its value for cracking gas oil brought a larger percentage of the price of crude than in previous years.

Excellent demand for fuel oil in the first quarter of 1927 kept the market for 24-26 above $1 per barrel in spite of mounting crude production and lower prices for raw material. The average price for the year was 98.8 cents per barrel as compared with 72 cents in 1921, $1.03 in 1922, 96 cents in 1923, 99 cents in 1924, $1.11 in 1925 and $1.32 cents per barrel in 1926. The average for the year was 71.2 per cent of 36 gravity crude as compared with 62.76 per cent of 36 gravity oil in 1926.

The attached tabulation of average prices for six principal commodities shows gasoline markets declined almost the same percentage as the crude market in 1927. The price of 36 gravity oil at the well in Oklahoma averaged $1.385 per barrel in 1927 as compared with $2.10 in 1926, a reduction of 34.05 per cent.

The market for 64-66, 375 end point gasoline fell 34.95 per cent in 1927 as compared with 1926, while the 58-60 U. S. Motor market fell 34.83 per cent.

The market price of 41-43 kerosene fell 35.98 per cent as compared with 1926 but all heavier oils showed a smaller decline on a percentage basis than 36 gravity crude. Stove distillate prices fell 32.57 per cent, gas oil 24.71 per cent, and 24-26 fuel oil 25.04 per cent.

LOS ANGELES, Dec. 31.—The next meeting of the California Natural Gasoline Association will be held at 6:00 p.m. Jan. 12, at the Alexandria Hotel, Los Angeles, at which time Francis W. Lake, production superintendent for the Union Oil Co. in Orange county, will read a paper on "Drilling and Production Practices." It is also planned to discuss the paper recently published in NATIONAL PETROLEUM NEWS on the defective charcoal test. If there is sufficient time, other discussions will be taken up.

Fire Marshals to Take Up Accident Prevention at Meeting Jan. 12

WASHINGTON, Jan. 3

WHAT refiner's fire marshals can do in accident prevention, some advantages of fire and accident prevention, first aid training, organization of fire brigades in plants are subjects to be discussed at the annual meeting of the Fire Marshals' Association of the National Petroleum Association in Pittsburgh Jan. 12. The meeting will be at the William Penn hotel, beginning at 10 a. m.

At the morning meeting "A Greeting Of Welcome" will be given by R. A. Wotowitch, trustee in charge, department of welfare and insurance of the National Petroleum Association. James H. Herbert, of the Conewango Refining Co. and president of the Fire Marshals' Association will follow with opening remarks and announcements. "A Message from the National Petroleum Association" will be given by E. M. Lyons, president of the association and president of the Tiona Refining Co. Mr. Herbert's address will be "Our Fire Marshals And Their Work". James F. Sweeney, vice-president of the Fire Marshals' Association will speak on "The Organization of Fire Brigades in the Plants".

At 1 o'clock there will be a luncheon and business session.

Houston Dunn, secretary-treasurer of the National Petroleum Mutual Fire Insurance Co., opens the afternoon meeting, speaking on "Some Advantages of Fire and Accident Prevention". "First Aid Training", will be discussed by J. J. Forbes, supervising engineer, safety division of the U. S. Bureau of Mines at Pittsburgh. H. N. Blakeslee, field representative, petroleum section of the National Safety Council, speaks on "What the Fire Marshals Can Do in Accident Prevention".

Group reports to be made by fire marshals are: Warren, James F. Sweeney, Viking Oil Co.; Bradford, Frank Phillipbar, Kendall Refining Co.; Oil City, Wayne K. Glenn, Pennsylvania Refining Co.; West Virginia, Mr. Brown, and other groups.

An announcement of the annual meeting has been made to National Petroleum Association members in a bulletin from Fayette B. Dow, general counsel.

"We did not create the Fire Marshals' Association as one more contribution to the already fairly large inventory of unnecessary association machinery," Mr. Dow's bulletin states. "We created it to give the fire marshals an opportunity to meet together one day a year in their own organization. A meeting where groups engage in the same work can meet, listen to informed discussion, exchange experiences, get a sense of identification with a common cause, and receive the encouragement to new endeavor which wholehearted cooperation always gives human beings."

Late Tank Wagon Changes

TULSA—Notice of these gasoline and kerosene changes arrived too late to correct the prices in the tank wagon table in this week's issue:

Little Rock kerosene reduced 1 cent, Dec. 19, making tank wagon price 11 cents. Texarkana, Tex. gasoline tank wagon reduced 1 cent, service station 3 cents, to 14 cents and 15 cents respectively, including 3 cent Texas road tax.

* * *

MANCHESTER, N. H., Jan. 4.—The gasoline road tax in New Hampshire was raised 1 cent on Jan. 1, to 4 cents, and gasoline was raised 1 cent to cover. This tax increase is not shown in the tank wagon table of this week's issue, but prices will be corrected in the Jan. 11 issue.

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Prairie and New Jersey Standard Join To Pipe Panhandle Gas to Denver

Staff Special
NEW YORK, Dec. 29

THE much-talked of natural gas pipe line from the rich gas fields in the Texas Panhandle to serve the city of Denver and other communities has materialized as a cooperative project, being undertaken by the Standard Oil Co. (New Jersey), Cities Service Co., and the Prairie Oil & Gas Co. through a subsidiary, the Producers & Refiners Corp.

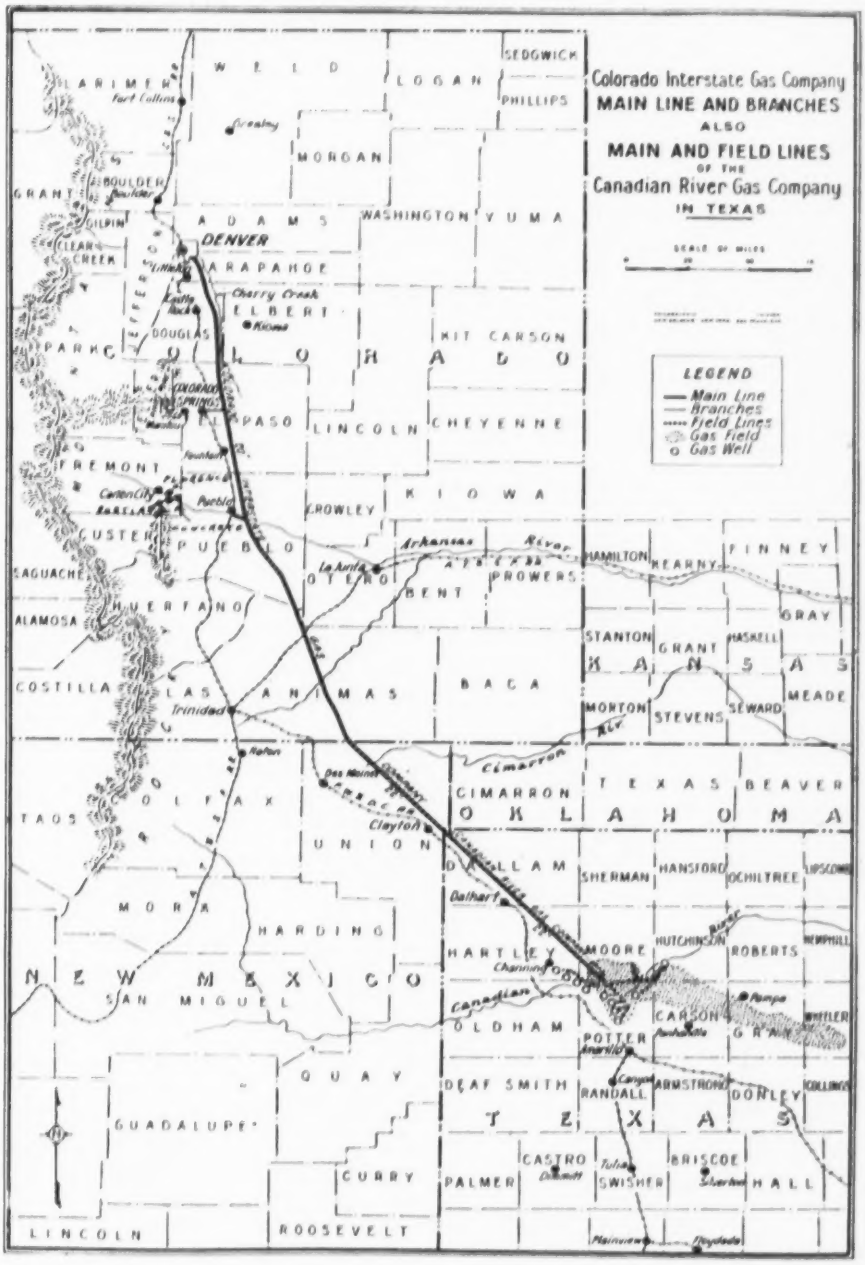
Details of the project were announced from the office of the New Jersey company here a few days ago. Pipe line right of way has been secured, the proposition entirely financed without going to the public, and some 700 cars of pipe delivered from the mills. It is expected the line will be laid and Denver served with natural gas within a few months. The cost of the project is estimated at $25,000,000. It is the largest single undertaking ever made in the natural gas industry.

Point is added to the cooperative feature of the undertaking by the fact that the lineup of companies that are taking part, finds the Standard of New Jersey and Prairie interests, along with the Cities Service to a lesser extent, owners of the Colorado Interstate Gas Co., which is to build and operate 265 miles of 22-inch line from Clayton, N. M., to Denver city limits. The sidewalk economists of the oil industry, in the Mid-Continent field, have professed to see an irreparable split between the New Jersey Standard and Prairie companies, because of the policy the former company has followed of late years in developing its own crude supplies, thus calling on the Prairie production and pipe line facilities to furnish diminishing quantities of crude to the Standard's eastern refining plants.

In the Colorado Interstate Gas Co., the Standard of New Jersey is doing the financing of the project; the Prairie, through the Producers & Refiners, is making possible the natural gas the line is to transport, and the Cities Service Co. is supplying the market through contracts its subsidiaries own for the distribution of natural gas in Denver and Pueblo.

The Standard of New Jersey owns 42½ per cent of the Colorado Interstate Gas Co.; the Southwestern Development Co., owned by the Producers & Refiners and the Mission Oil Co., owns 42½ per cent, and the Cities Service Co. owns 15 per cent. The Mission Oil Co. was organized in 1921 and acquired considerable gas acreage in the Texas Panhandle.

Chairman of the board of the Colorado Interstate is W. S. Fitzpatrick, of the Prairie Oil & Gas Co. President is Christy Payne, director of the Standard Oil Co. (New Jersey) in charge of natural gas interests. The two vice-presidents are A. R. Jones, Kansas City, banker, chairman of the board, Mission Oil Co., and vice president, Southwestern Development Co., and R. W. Gallagher, president of the East Ohio Gas Co., Cleveland, a Standard subsidiary. Treasurer is J. B. Luse, Standard of New Jersey, New York, an executive in the natural gas department of the company. Secretary is E. E. DuVall, and attorney is E. S. Hall, both of the New Jersey Standard. On the board of directors also is H. C. Cooper, Hope Natural Gas Co., Pittsburgh, another Standard subsidiary. The company is incorporated in Delaware for 1,250,000 shares of common stock, of no par value, and 20,000 shares of preferred, of $100 par value. The Standard of New Jersey



owns 42½ per cent of the common stock and half the preferred.

Natural gas to be transported through the Colorado Interstate line is coming from enormous gas acreage around Amarillo in the heart of the Texas Panhandle field, which was secured several years ago, before the development of the Panhandle oil field, by the Kistler brothers, large owners in the Producers & Refiners Corp. before it was taken over by the Prairie. The Canadian River Gas Co. has been organized to develop this gas territory, of which one single block takes in more than 350,000 acres.

THE Canadian River Gas Co. is owned by the Southwestern Development Co., a holding company owned in turn by the Producers & Refiners and the Mission Oil Co. The Southwestern Development Co. also owns the Amarillo Oil Co., with a large area of gas and oil lands in the Panhandle territory.

Geologists and engineers have estimated the gas supply in the lands under control sufficient to supply the maximum estimated requirements of the project for the 20 years used as a basis for planning and for an indefinite period beyond that.

The Canadian River Gas Co. is to develop the gas supply as needed and turn it over to the Colorado Interstate Gas Co. at Clayton. It will build about 86 miles of 22-inch line from the fields to Clayton. The Colorado Interstate has a contract to buy gas from the Canadian River Gas Co. To finance the development of the gas properties the Standard of New Jersey has taken $10,000,000 in bonds of the Southwestern Development Co.

The gas line of the Colorado Interstate Gas Co. is to be built and operated by the New York engineering firm of Ford, Bacon & Davis, which company also built the Interstate Natural Gas Co.'s line a year ago for the Standard of New Jersey, this line piping gas from the Monroe gas field of northern Louisiana to the Baton Rouge refinery of the Standard Oil Co. of Louisiana. E. G. Hill is in charge of construction of the line for the engineering firm. The line to Denver will have a maximum capacity of 125,000,000 cubic feet a day.

THIS gas will be sold wholesale to the Public Service Co. of Colorado for distribution in Denver, and to the Pueblo Gas & Fuel Co. for sale in Pueblo, Col. It will be supplied to Colorado Springs and will be available to large industrial consumers in Denver, Pueblo, Colorado Springs, and other points. The main line, 86 miles from the Amarillo fields to Clayton and from Clayton to Denver City limits will be 22-inch.

CHRISTY PAYNE
Director of Standard Oil Co. (New Jersey), president of Colorado Interstate Gas Co.

It will be a screw line, contracts for 81,800 tons of the pipe having been let to the National Tube Co. Except for the Arkansas River crossing, and one or two other points, no difficulties are anticipated in laying the line, the great portion of which will run across plains country.

THE following is a part of the statement concerning this project and other pipe lines owned by the Standard of New Jersey by Christy Payne, which appeared in the latest issue of the Lamp, official publication of the Standard Oil Co. (New Jersey):

"The main line of the Colorado Interstate Gas Co. will be approximately 264 miles in length, made up of 156 miles of 22-inch pipe extending from Clayton to Pueblo and 108 miles of 20-inch pipe from Pueblo to Denver. Branch lines of smaller size will extend from the main line to Portland and Concrete, a distance of 27 miles, should the cement plants in those places contract for fuel. A telephone line will also be built in connection with the pipe line.

"The line has been surveyed, rights of way are almost complete, soil tests have been taken to determine what protective measures are necessary against corrosion, and a study of the more difficult construction problems which will be met in the crossing of the Canyon of the Purgatoire, the swift Arkansas River and the rocky canyons, arroyos and foothills has been made, but for the most part the route of the pipe line traverses favorable prairie land, parallel and east of the mountains and only the ordinary difficulties attendant upon the laying of large diameter pipe will be encountered. A very large percentage of the ditching may be done with machines. A map of the field and route of the pipe line and several views of the country to be traversed are shown.

"THE cost of the project, including the money to be spent by the Colorado Interstate Gas Co. and the investments of the Canadian River Gas Co., will total between $22,000,000 and $23,000,000 in the initial construction work, and the Public Service Co. of Colorado for distribution in Denver and other places will spend something in excess of $2,000,000. Contract for the construction of the main line from the Amarillo field to Clayton, 86 miles, has been awarded to the Oklahoma Contracting Co., and the contract of the Colorado Interstate Gas Co. line, 264 miles, has been let to Williams Bros., Inc. Contract for pipe amounting to 81,800 tons has been taken by the National Tube Co., and the first shipments of pipe arrived at Devine, Colo., in the week of Nov. 20th."

"The Cities Service Co. contributes to the project a block of approximately 16,000 acres of gas territory in the Amarillo field, but its main interest is through the contracts which its subsidiaries have made for the distribution of natural gas in Denver and Pueblo. A satisfactory ordinance was granted by the city of Denver, but only after it had thoroughly investigated every factor entering into the project and had hired an expert engineer, who made an exhaustive study covering the benefits to be derived by the city from a natural gas supply, the security of the natural gas reserve back of the project, the soundness of the pipe line plans and the reasonableness of the rates proposed. . . . .

"THE Interstate line, together with the projected Colorado line, totals more than 520 miles of main natural gas line construction which the Standard Oil Co. (New Jersey) has been interested in as an owner or as a purchaser of gas within a period of two years. The extent of these undertakings is apparent when it is realized that these new lines are constructed of the maximum diameter pipe so far used in natural gas transmission, the pipe weighing as high as 93 pounds per foot. The total tonnage and field lines amount to something like 123,800 tons of pipe, most of it laid in sparsely settled country, through prairies, swamps, canyons, forests and rivers."

Harder Competition In Selling Faced By Business In 1928

INTENSIVE selling and pressure to lower production costs will be the principal factors in business in this country in 1928, according to reports of 100 editors of business papers to the National Conference of Business Paper Editors and the Associated Business Papers.

Business prospects in general are reported sound. There are no indications of a slump, but rather definite indications of increases in several lines. Increases in stocks at the end of 1927 over 1926 are reported but in a very few lines. Petroleum is prominent among these few lines. Farm buying will be larger in 1928 than 1927.

Indexes of trade which measure week to week activities, such as electric power used, output of pig iron and steel ingots, building construction, freight loadings, are slightly over or slightly under those of 1926. Power used in 1927 increased 7 per cent over the previous year. Pig iron totaled 36,300,000 tons, putting 1927 in eighth place among big years. Steel ingot output was about 8 per cent less for 1927 than in 1926, making 1927 fifth among years of largest output. Total construction was down, but up 2½ per cent in industrial building and 11 per cent in heavy construction.

Editors of papers report increased pressure to reduce production and selling costs, higher specialization in machinery, wide-spread replacement of obsolete and inefficient machinery, aggressive market finding, reduction in size and intensive development of jobbing areas. There is likewise a genuine desire to keep wages at their present level in all the basic industries and manufacturers and merchants are seeking to continue with narrow profit margins without reducing wages or raising prices. Some trades show softening in prices, but most trends indicate price of 1928 about the same as 1927.

General construction is reported lower, due to reduction of residential building, with industrial construction and certain classes of public works building very much increased. Heavy construction is 11 per cent higher, industrial construction is 2½ per cent higher, electric light and power plant construction about 5 per cent over 1926, with an estimated additional 5 per cent increase in 1928. It is expected that some $940,000,000 will be invested in construction and equipment in the electric light and power industry in 1928. During 1927 $1,000,000 a day was spent for new hospital buildings, and the rate for next year will be higher.

In the automotive industry expenditures for new plants were larger in 1927 than in 1926 due especially to one or two very large construction enterprises and the remodeling of the Ford plant. New construction in the textile field increased with an accompanying fact that many obsolete plants were modernized or dismantled. Rehabilitation of private power plants continued through 1927 and promises to be still more active in 1928.

High specialization in machinery to reduce production costs marked several basic industries. In the cotton and rayon division of the textile industries plants have been brought up to very high efficiency. Steel mills averaged 75 per cent of capacity in 1927 against 83 per cent in 1926; pig iron capacity 73 per cent in 1927 against 80 per cent in 1926. In metal working lines the average of working operations was about 15 per cent less than in 1926. Nineteen twenty-eight is expected to equal 1927.

The total pay rolls in practically all industries commented upon by these editors were less in 1927 than in 1926. The notable exceptions were in the field of transportation. Railroad pay rolls were advanced about $60,000,000 and those of the companies operating bus lines increased 30 per cent. Although there was a general shrinkage in aggregate pay rolls the hourly rate for workers changed little and there are no important indications of downward wage revisions during the coming year.

Prices throughout 1927 are reported as slightly lower and margin of profit less but the outlook for 1928 is generally considered favorable with some slight price increases. Pig iron prices during 1927 averaged ten per cent less than in 1926 and steel prices were four or five per cent less. The profits of steel companies for the first nine months were from 15 to 20 per cent less than for the same period in 1926.

In general the close of 1927 finds the industries of the United States with stocks which deviate little from the volume at the close of 1926, reflecting continued hand-to-mouth buying. In the oil fields the total stocks of crude and refined products increased about 12 per cent during this year. Retail merchants bought more freely than usual, but moved their merchandise very satisfactorily.

Iron and steel stocks are considerably lower than they were a year ago and the unfilled orders of the steel companies are from 12 to 15 per cent below those of the close of 1926. Crude rubber stocks are ample to offset any upward price movement. Volume of coal trade was less in 1927 than 1926 and stocks on hand are larger.

ACCOMPANYING is a summary of business conditions in this country in 1927 and estimate as to the general course business will pursue in 1928, prepared from reports submitted to the National Conference of Business Paper Editors and the Associated Business Papers by editors of 100 of the leading business papers in all lines of industry in this country. NATIONAL PETROLEUM NEWS is an active member of both organizations.

Laws Prevent Agreement Restricting Operations

Staff Special

HOUSTON, Jan. 2.—Governor Dan Moody's suggestion of restrained operations on University of Texas lands hit a legal snag when the position was taken generally that the anti-trust statutes of Texas do not permit such agreements, even at the instance of the state administration.

Insofar as present operations are concerned, however, the governor's suggestion would have had little effect even if applied. In the Big Lake field of Reagan county, which is entirely on University land, not a single well is drilling. There are also less than 10 wells drilling on University land in the so-called Church & Fields pool of Crane county.

The governor's suggestion, had it been possible to act on it, might have had the effect of holding back some wildcatting operations on University land in 1928. Provisions of the permit law under which these lands were taken up, however, set up definite requirements and drilling must be pursued before expiration dates. The penalty for failure to drill as required is that all rights revert to the University.

It is not considered likely that anything more can come of the governor's suggestion, although a motion was carried at a recent Fort Worth meeting of operators with J. T. Robinson, land commissioner, that a committee of five should be appointed by President John O'Donoho of the Texas division of the Mid-Continent Oil & Gas Association "to discuss the situation with the governor at his request or the request of the land commissioner."

Holds Old Bulk Pressure Cracking Art Does Not Affect Modern Patents

By Paul Truesdell
N. P. N. STAFF WRITER

CLEVELAND, Jan. 3

CRACKING, practiced in small vessels under relatively low pressures, using a heavy, dirty cracking stock such as shale oil, to produce chiefly illuminating oil and incidentally a little benzine, is not to be taken as anticipating modern pressure cracking of gas oil, it is held by Charles Martindale, special master who heard the suit of the government versus the Patent Club.

The master filed his report with the judges of federal district court in Chicago on Dec. 5. An analysis of the possible effect of the report was carried on page 21 of the Dec. 28 issue of NATIONAL PETROLEUM NEWS. The discussion by the master of the Young and Dewar and Redwood patents in their relation to the patents owned by members of the club, was also printed in that article last week, which took up the "bulk pressure distillation" division of the prior art contained in the report.

In this article, further consideration given by the master to the prior art of bulk pressure distillation will be published.

The Riebeck or Krey process, as disclosed by German publications in 1897, 1898 and 1913 were introduced by the government, particularly against Burton patent No. 1,049,667, Burton No. 1,167,884; the Ellis patent No. 1,318,060 and also as having some application to Burton No. 1,105,961 and Palmer No. 1,187,380.

In discussing Krey and Riebeck, the master said:

"THE Krey disclosure and the Riebeck patent covering the same, was an experimental process and it was carried on with small apparatus wholly unsuited to the commercial requirements in the United States for producing gasoline, the pressure varying between 30 and 90 pounds and the temperature being 400 to 450 degrees Cent.

"The Riebeck still had a capacity of 150 gallons, which is about 2 per cent of the size of the Burton still, which holds over 8000 gallons.

"Riebeck's still had walls approximately an inch and a half thick and in such a small operation it was possible to run at a red heat and have no particular difficulty because, even with considerable pressure, the amount of stress on thick walled retorts of small diameter such as were employed is not enough to make red hot bottoms a source of danger. But in the operation of very large stills the matter becomes serious.

"The difference between large and small stills in their ability to generate coke or the danger which resulted from running red hot must not be overlooked in examining such prior art references.

"IF CARRIED out upon the same ratio the still in the Burton apparatus and process (which has walls only half an inch in thickness) to correspond to Riebeck would be required to have a thickness of more than a foot which would be utterly impracticable.

"Krey admits that notwithstanding his walls were of extraordinary thickness relative to the capacity of his still, he had two ruptures of his stills and therefore went to light cracking to make illuminating oil and only 6 per cent of benzine of 57 degrees Bé. Gravity.

"The Krey-Riebeck disclosure operated on a cycle of two and a half turns per day of 24 hours at from 15 to 100 pounds pressure to take off varying percentages of distillate. It was run to take off 60 per cent of distillate leaving a 30 per cent residue with a 10 per cent loss. The total yield per still per day would be about 25 gallons of gasoline.

"The stock operated upon in this Riebeck operation was brown-coal tar oil which is sometimes in the publications referred to as gas oil but is not to be confused with the American gas oil from domestic petroleums. It is a heavy dirty stock and could not be satisfactorily used in carrying out Burton's process.

"THE Krey-Riebeck disclosure in any of the exhibits referring to it does not disclose any of the processes or products of the patents here in issue, and if they even hint at them, they do not set them forth with that full, clear and precise description which would enable one skilled in the art to practice the invention of the patents in suit."

The Laing patent, cited by the government, is next analyzed by the special master as follows: (Laing is not to be confused with Lang, discussed last week.)

"The Laing disclosure is contained in Laing U. S. Patents No. 471,291, March 22, 1892; No. 488,467, Dec. 27, 1892; a paper by Laing in the Royal Scottish Society of Arts at Edinburgh and Laing British patent No. 23,446, of 1912.

"The Laing references are cited against three of the Adams patents, the original Burton patent, No. 1,049,667, the Humphreys run back patent and the Palmer patent.

"Laing's purpose was to distill at atmospheric or low pressure heavy reduced crudes for kerosene and by a small amount of cracking to add some of the light ends to his kerosene. He has the old idea that cracking is caused by the condensation of part of the vapors into liquids

Exceptions Filed By U. S. In Patent Club Case

Staff Special

CHICAGO, Dec. 29.—United States department of justice, on Dec. 27 filed a document in its case against the Patent Club containing 273 printed exceptions to the recent report of Master in Chancery Charles Martindale. They compare almost verbatim with the 273 objections filed by the government with the master before his report was of record.

The case of U. S. vs. Standard Oil Co., et al (as the Patent Club case is styled) was started two and a half years ago by the Government charging monopoly and conspiracy. Litigation ended Dec. 7, 1927, when the Master's voluminous report was filed in the case declaring that all the equity was with the defendants; 50 oil companies with cracking processes.

The government had 20 days in which to file its exceptions and filed them on the 20th day. Oil company attorneys frankly consider it a perfunctory gesture.

Before the case is actually over there will be a court hearing before a bank of three judges, sitting in U. S. District court in Chicago. All the defendants and all the attorneys of record in the case will have to be given ample notice before the final hearing takes place. None of the judges have expressed themselves as to a probable date but it is not expected for several months.

Gasoline Products Company Patents:

Inventor	Patent Number	Dated	Improvements in
Walter M. Cross	1,203,312	Oct. 31, 1916	Process of treating hydrocarbons and products derived therefrom
do	1,326,851	Dec. 30, 1919	Process of treating hydrocarbons
Roy Cross	1,423,500	July 18, 1922	Process of treating petroleum oil
do	1,437,229	Nov. 28, 1922	Process of treating petroleum
Walter M. Cross	1,540,764	June 9, 1925	Apparatus for treating petroleum oils
John C. Black	1,456,419	Aug. 22, 1922	Process for the production of low boiling point hydrocarbons
do	1,426,813	Oct. 10, 1922	Process and apparatus for treating hydrocarbons to produce those of lower boiling points
do	1,431,772	Feb. 27, 1923	Process and apparatus for refining petroleum oil
do	1,447,118	May 22, 1923	Process and apparatus for the production of low boiling point hydrocarbons

The Texas Company Patents:

William A. Hall	1,175,909	March 14, 1916	Process for the conversion of heavy hydrocarbons into lighter hydrocarbons
do	1,175,910	March 14, 1916	Process of making motor fuel
do	1,194,289	August 8, 1916	Process of cracking hydrocarbons
do	1,239,099	Sept. 4, 1917	Hydrocarbon product
do	1,129,100	Sept. 4, 1917	Liquid fuel
do	1,242,795	Oct. 9, 1917	Process for the production of motorspirit from hvy. hydrocarbons
do	1,242,796	Oct. 9, 1917	Producing motor fuel
do	1,261,930	April 9, 1918	Art of converting hydrocarbon
do	1,285,136	Nov. 19, 1918	Apparatus for making motor fuel
Joseph H. Adams	1,320,354	Oct. 28, 1919	Oil-converting apparatus
do	1,320,726	Nov. 4, 1919	Process for the conversion of liquids, fluids and oils
do	1,320,727	Nov. 4, 1919	Apparatus for the conversion of liquids, fluids and oils
do	1,327,263	Jan. 6, 1920	Process for the conversion of liquids, fluids and oils
do	1,428,311	Sept. 5, 1922	Oil-converting process for the conversion and transformation of oils
do	1,428,312	Sept. 5, 1922	Oil-converting apparatus for the conversion and transformation of oils
Frederick T. Manley	1,428,338	Sept. 5, 1922	Apparatus for cracking hydrocarbon oils
do	1,428,339	Sept. 5, 1922	Method of cracking hydrocarbon oils
Joseph H. Adams	1,433,519	Oct. 24, 1922	Process for the conversion and transformation of liquids, fluids and oils
Luis de Florez	1,437,045	Nov. 28, 1922	Process of making motor fuel
Joseph H. Adams	1,445,281	Feb. 13, 1923	Apparatus for the conversion of oils
do	1,455,376	May 15, 1923	Process of converting oils
do	1,455,377	May 15, 1923	Oil-converting apparatus
do	1,461,017	July 3, 1923	Apparatus for the conversion and transformation of liquids, fluids and oils
Frederick T. Manley	1,462,143	July 17, 1923	Method of cracking hydrocarbon oils
Joseph H. Adams	1,462,677	July 24, 1923	Oil-converting process for the conversion and transformation of oils
do	1,462,678	July 24, 1923	Oil-converting apparatus
do	1,477,860	Dec. 18, 1923	Oil converting apparatus for the conversion and transformation of oils
do	1,506,877	Sept. 2, 1924	Process for the conversion and transformation of liquids, fluids and oils
do	1,506,878	Sept. 2, 1924	Process for the conversion and trans. of liquids, fluids and oils

Standard Oil Company (Indiana) Patents:

James S. Lang	954,575	April 12, 1910	Apparatus for distilling hydrocarbon oils
Wm. M. Burton	1,049,667	Jan. 7, 1913	Manufacture of gasoline
do	1,055,707	March 11, 1913	Process of producing asphalt
do	1,105,961	Aug. 4, 1914	Manufacture of gasoline
do	1,112,113	Sept. 29, 1914	Process for producing wax from other hydrocarbons
Edgar M. Clark	1,119,496	Dec. 1, 1914	Method of distilling petroleum
Robt. E. Humphreys	1,119,700	Dec. 1, 1914	Method of distilling hydrocarbons
do	1,122,002	Dec. 22, 1914	Petroleum-distilling apparatus
do	1,122,003	Dec. 22, 1914	Process of distilling petroleum
Francis M. Rogers and Thos. S. Cooke	1,122,220	Dec. 22, 1914	Means for controlling still-pressure in gasoline manufacture
Edgar M. Clark	1,129,034	Feb. 16, 1915	Art of petroleum distillation
John B. Moore	1,130,318	March 2, 1915	Apparatus for distilling petroleum oils
Edgar M. Clark	1,132,163	March 16, 1915	Art of petroleum distillation
Wm. M. Burton	1,160,689	Nov. 16, 1915	Method of safeguarding stills
do	1,167,884	Jan. 11, 1916	Petroleum product
Charles S. Palmer	1,187,380	June 12, 1916	Process of treating petroleum residues
Gentry Cash	1,230,065	June 12, 1917	Stuffing-box
Charles S. Palmer	1,313,009	Aug. 12, 1919	Process of treating petroleum residues, etc.
Robt. E. Humphreys and Wm. M. Burton	1,343,674	June 15, 1920	Distillation of petroleum oils
Charles S. Palmer	1,360,973	Nov. 30, 1920	Process of treating coal, tar, heavy oils resulting from the distillation of bituminous coal, etc.
Edgar M. Clark	1,388,514	Aug. 23, 1921	Distillation of petroleum hydrocarbons
Frank B. Lewis and Thos. S. Cook	1,392,584	Oct. 4, 1921	Art of distilling petroleum oils
Wm. M. Burton and Edgar M. Clark	1,448,254	March 13, 1923	Process of treating petroleum oils

Standard Oil Company (New Jersey) Patents:

Alfred A. Wells	1,187,874	June 20, 1916	Cracking oil
Carleton Ellis	1,216,971	Feb. 20, 1917	Treating oils, etc.
Alfred A. Wells	1,232,454	July 3, 1917	Process of decomposing oil
do	1,248,225	Nov. 27, 1917	Process of and apparatus for decomposing hydrocarbon oils
Carleton Ellis	1,249,278	Dec. 4, 1917	Treating oils
do	1,317,868	Oct. 7, 1919	Process of making derivatives of petroleum hydrocarbons
do	1,318,060	Oct. 7, 1919	Motor spirit
do	1,318,061	Oct. 7, 1919	Process of making motor fuel
do	1,341,975	June 1, 1920	Making gas oil
do	1,396,999	Nov. 15, 1921	Making gasoline substitute
Edgar M. Clark	1,405,286	Jan. 31, 1922	Art of pressure distillation
do	1,410,797	March 28, 1922	Art of pressure distillation
do	1,413,899	April 25, 1922	Refining of petroleum oil
Carleton Ellis	1,415,232	May 9, 1922	Process of cracking oils under pressure
Edgar M. Clark, Nathaniel E. Loomis and James R. Carringer	1,478,102	Dec. 18, 1923	Art of treating oils

Standard Oil Company (New York)

Horace P. Chamberlain	1,221,790	April 3, 1917	Obtaining Products from petroleum by decomposition of component hydrocarbons thereof

which drop back into the still and by contact with the hot liquid in the still are cracked—which idea was discarded when Burton disclosed that cracking takes place through the whole body of the liquid and not suddenly when cold oil strikes a hot body of liquid.

"Laing states that condensation under pressure is disadvantageous because the liquid is surcharged with gas like an aerated water when the cork is drawn and that means loss of material as well as risk from fire. And not only so, but all your fittings, being under pressure could not be kept tight enough.

"The Laing intermediate condensers do not meet the disclosure of Humphreys' run back patent. They do not operate in the same way. Nor do they get the same result.

"The disclosure does not meet Adams and it certainly is far away from the Burton process both as to material treated and as to the manner in which it is treated."

The Pielsticker patents have been considerably cited in cracking patent infringement suits. These are British patent No. 1,308 of 1891 and U. S. 477,153 of 1922.

Concerning the first of these the master in his report quotes the second claim of the patent as follows:

"An apparatus for continuous distillation of hydrocarbon and other oils and liquid consisting of a supply tank, means of heating the same, of forcing the liquid into and through a heated coil connected with a steam jet or blast from whence it passes into and through a retort provided with baffle plates and drawoff cock fitted with steam ejector thence into and through a second heating coil which may or may not be provided with a steam inlet and the outlet of which may or may not be provided with means of retarding the outflow and which may lead into an expansion chamber and thence to a condenser in communication with a gasholder or other receptacle, the whole substantially as heretofore described."

"It is perfectly clear," the special master states, "that this reference does not disclose the invention of either of the Adams patents, the Humphreys run back, the Lewis and Cooke bubble tower, the Manley or Burton and Clark or Ellis cracking process."

As to the Pielsticker American patent, the master says:

"There is not a thing in the patent, as a disclosure of a process in regard to temperature and the operation is apparently intended to be carried on at atmospheric pressure or at some pressure of unspecified degree.

"The contention urged by the petitioner that the Pielsticker process ran at upwards of 60 pounds pressure with something equivalent to the very large modern run back and that it made gasoline is wholly a fanciful argument unjustified by the rules which must be applied to the consideration of a reference tendered as an anticipation."

The Barbet patents, U. S. No. 836,732 (1906) and French No. 322,265 (1903) the master finds that they bear no relation to the Adams, Burton 1,105,961 (rerunning) Clark, 1,410,797, Humphreys, 1,119,700, Palmer 1,187,380. Lewis & Cooke, 1,392,584 (bubble tower) and Chamberlain, Barbet patents were cited by the government's expert in the effort to impeach the patents mentioned.

Nov. Gain in Stocks 3,000,000 Bbls.

(By Telegraph)

WASHINGTON, Jan. 4.—In November crude stocks east of California and in California, and gasoline, kerosene and gas and fuel oil stocks for the entire country were increased over October, and lubricating stocks were decreased, according to Bureau of Mines statistics for November.

Total crude production in November was 73,778,000 barrels, a decrease of 3,303,000 barrels over October's production of 77,081,000 barrels. In November 1926 total production was 69,315,000 barrels.

Stocks east of California were 348,885,000 barrels Nov. 30, an increase of 3,528,000 barrels over October. Crude stocks in California increased 279,000 barrels to 113,746,000 barrels. Stocks east of California in November 1926 were 276,445,000 barrels and stocks in California 117,497,000 barrels.

Gasoline production in November was 28,558,000 barrels, a decrease of 345,000 barrels over the new high of 28,903,000 barrels established in October. Gasoline stocks were increased 851,000 barrels in November to 30,401,000 barrels. Production in November, 1926, was 25,885,000 barrels and stocks 35,916,000 barrels.

Kerosene production was 4,828,000 barrels as against 4,884,000 barrels in October, a decrease of 56,000 barrels. Stocks were increased 516,000 barrels to 7,841,000 barrels.

A decrease of 1,451,000 barrels was recorded in gas and fuel oil production in November which was 32,594,000 as against 34,045,000 barrels in October. Stocks were 126,192,000 barrels, an increase of 1,143,000 barrels over October.

Production of lubricating oils was down 280,000 barrels over October to 2,477,000 barrels, with stocks lowered 60,000 barrels to 7,524,000 barrels.

Coming Meetings

Fire Marshals' Association of the National Petroleum Association, William Penn Hotel, Pittsburgh, Pa., Jan. 12.

Wisconsin Independent Oil Jobbers Association, Plankinton Hotel, Milwaukee, Jan. 18.

South Dakota Independent Oil Jobbers Association, Carpenter Hotel, Sioux Falls, S. D. Jan. 18, 19.

Michigan Independent Oil Men's Association, Statler Hotel, Detroit, Feb. 2, 3.

Iowa Independent Oil Men's Association, Savory Hotel, Des Moines, Feb. 8, 9.

Illinois Petroleum Marketers Association, Hotel Abraham Lincoln, Springfield, Ill., Feb. 15, 16.

Ohio Petroleum Marketers Association Spring Convention and Exhibit Exposition, Neil House, Columbus, O., Feb. 22, 23, 24.

American Oil Men's Association, Hotel Stevens, Chicago, March 6, 7 and 8.

Independent Oil Men of America, annual election, Stevens Hotel, Chicago, March 19, 20, 21.

American Oil Burner Association, Hotel Stevens, Chicago, April 3, 4, 5, 1928.

National Petroleum Association, Cambridge Springs, Pa., April 19, 20.

Muskegon, Mich., Wildcat Flows 107 Bbls. Daily

CLEVELAND, Jan. 4.—A wildcat well of the Muskegon Oil Co., a mile and a half north of the main part of Muskegon, Mich., has been producing a 37 gravity crude at the rate of 107 barrels a day since the middle of December. This well is in pure wildcat territory, no oil or gas developments having taken place in this vicinity before as far as is known, except one dry hole four miles south of this well drilled by the same interests.

Several oil companies are now taking acreage in the vicinity and two more wells are to start drilling within a week. One is a second test of the Muskegon Oil Corp., made up of capital from Joliet, Ill., and the other a test of a drilling contractor who is moving his tools over from the Saginaw, Mich., field.

The Standard of Indiana is taking the oil from the present well in tank cars and shipping it to Whiting. The well drilled into gas at 1640 feet, sprayed oil at 1658 feet, and, when drilled two or three feet further in, started flowing. It flowed 200 barrels the next three days and 300 barrels the following four days. After agitating it flowed 190 barrels daily for five days and then dropped to 107 barrels, this being the last report.

Battle For Industrial Survival Forces Oil Market Expansion

By D. E. Buchanan*

I FIRMLY believe the entire petroleum industry is, right today, face to face with the necessity for inaugurating a scientific research program dedicated to the development of new markets and the enlargement of markets now supplied, and that such a movement must concern itself with every known product of petroleum from the lightest gases clear down through the hydro-carbon series to asphalt and coke. In the natural gas field, the American Gas Association is already engaged in some very constructive market development of this kind.

If in the light of the best information that can be secured we are justified in casting aside apprehension as to future supply, which has in the past always seemed to make us wary of encouraging diversified uses, then I think our duty to the industry, our stockholders and the public is clear, and that we have every reason in the world for attempting to improve our situation through new and diversified uses of petroleum products.

With the possible exception of the lubricating field, we have as an industry done practically nothing to develop outlets for our products. Surely in no other industry of a magnitude worthy of mention in comparison is there such an obvious lack of merchandising policy. Insofar as the petroleum industry is concerned, why make all the progress in our ability to find, produce and manufacture petroleum? Why not direct some of our scientific effort, for awhile at least, to the very urgent problem of more scientific merchandising? In other words, let's bring the selling end of our business up to date.

We must admit that the petroleum industry has had its market handed to it on the proverbial silver platter. In fact we might say our market for gasoline has actually been forced upon us. We say much and hear much about the wonderful achievements of the industry in keeping pace with the tremendous increase in demand for gasoline, and indeed the scientific development in the arts of finding and producing crude petroleum and the manufacturing of products therefrom is an industrial accomplishment second to none, but, as far as marketing is concerned, surely we have done nothing of which we may be proud.

We seem to worry more about when we are going to get the next barrel of oil than what we are going to do with the 600,000,000 barrels we have in our tanks. Perhaps our policy has been justified by reason of the tremendous demands made upon the industry, but surely the day is here when we need a new vision.

I believe when everything possible has been done to bring about more orderly production of crude oil, be it through legislation or co-operative effort or both, that it will still remain for our sales department to save our business, and that department cannot function so long as we over supply the markets now open to them and place no means at their disposal for expanding those markets and developing new outlets.

TODAY'S quest for gallonage is only at the expense of our neighbor and is, therefore, to the detriment of the welfare of all. Tomorrow's effort must be an industry-wide crusade for gallonage in channels today undeveloped.

There is no reason in the world why the petroleum industry should not bend every effort to introduce the use of petroleum in many directions now unknown to us as a possible outlet. There is no use to which petroleum will ever be put that can be classed as wasteful in comparison with the waste accompanying the situation we have today, with production so far in excess of consumption.

WE ARE suffering from too much efficiency in every branch of the industry except sales. We know well how to find oil; we know well how to produce it; we know well how to manufacture it into various products, but we know too little about the uses to which the products should be put and their value as energy producing agents.

We get our merchandise all wrapped up in a beautiful package, tied with a blue ribbon, etc., and then the scramble begins. We seem to vie with one another to see who can sell the package at the most ridiculous price—costs considered. In many cases we even give the package away, blue ribbon and all. We get all dressed up with no place to go.

We cannot blame the public for thinking gasoline should be even cheaper than it is today when we are

*Vice-president in charge of sales, Chestnut & Smith Corp., Tulsa.

Relief Lies in Finding Wider Markets

(High Points from Mr. Buchanan's Remarks)

WE ARE face to face with the necessity of inaugurating a scientific research program to develop new markets for oil and to enlarge the present markets.

It is our duty to the public, the industry and to our stockholders to improve the present situation through diversified uses of petroleum.

Let's bring the selling end of the industry up to date.

Today's quest for gallonage is only at the expense of our neighbors and therefore to the detriment of the welfare of all. Tomorrow's efforts must be an industry-wide crusade for gallonage in channels today undeveloped.

We cannot blame the public for thinking gasoline should even be cheaper than it is today when we all are breaking our necks to get business away from our competitors at a price below what our competitor is charging.

It behooves us in this scientific age to face more seriously the possibility of substitutes for oil products.

Survival of the fittest may be between industries and not survival of the fittest as between units in the industry.

Research program is a task for the entire industry through a collective effort representing every branch and therefore every product of our manufacture.

We have been taught to think in terms of millions of barrels, but from now on we must adjust our sight so fine that we will be able to see every possible additional use, be the quantity required ever so small.

all breaking our necks to get business away from our competitor at a price below what our competitor is charging. Practically every ounce of sales energy today is directed toward taking business away from a competitor, either through knocking his product or cutting his price, rather than in developing new outlets. We cannot expect the public to believe us when we say we are losing money at the price we are willing to accept for our product. I do not believe the public, yet, has such a poor opinion of the business ability of this industry. We belong to a fraternity of the greatest philanthropists in the world, giving away millions of dollars every day and when we get it all given away we will go to the poor house. The public will not even thank us.

THE United States has for a long time produced more than 70 per cent of the world's supply of petroleum but the scenes are changing. Production possibilities in other parts of the world are practically unkown. Certain South American countries, Persia, Russia and Dutch East Indies, bid fair to produce an ever increasing percentage of the world's petroleum. Much of this production is owned by companies controlled in other countries and it seems altogether probable that the program of refinery enlargement now under way in some of those countries will be continued. In other words, it does not seem reasonable that foreign companies will sell their crude oil produced in a foreign country, to an American refiner and then buy gasoline for consumption at home.

We say the export business has been "shot" this year. Well it is going to stay shot for some time. During the calendar year 1926, our gasoline exports increased 37.5 per cent over 1925 and 206 per cent over 1922, an average of over 33 per cent every year for four years, but for the first seven months of this year we actually exported less gasoline than we exported during the same period last year. If our exports for the whole of this year increase 2 per cent over 1926, we will be fortunate and this does not mean that there are fewer automobiles in service in foreign countries. It simply means that we are being called upon to supply less of the motor fuel for those countries. It is being manufactured at home.

No foreign power is unmindful of the prestige and political security guaranteed by an ample supply of petroleum and the progressive nations of the world are, quite naturally, doing everything in their power to develop a supply independent of the United States. I firmly believe our export business is on the wane. If that be true, is it not another reason why we should bend every effort toward the establishment of new and wider markets at home?

In what condition are we to withstand the shock of a substitute for any of our major products? We are probably justified in feeling secure in our present position so long as present prices obtain because no substitutes have yet been developed which can be made available to the public at such low prices. Are we then to admit that our security from substitution lies only in the maintenance of present price levels?

Surely it behooves us, in this age of such wonderful scientific discoveries and developments, to face more seriously the possibility of substitutes and the more efficient application of our products which will have the effect of lessening our demand. With gasoline, our major product, where use is confined almost exclusively to internal combustion engines, and the internal combustion engine delivers such a small fraction of the potential energy contained in gasoline, are we not going on dangerous ground until we have so many diversified uses for our products that the substitution of any of them will not paralyze the industry? About the only reason we can advance as to why there is no immediate danger is the low level of our prices. That answer acknowledges the possibility and is at best a weak argument.

IN THE field of substitution we see all about us a battle of giants in the industrial world. Steel for lumber, cement for steel and so on down a long list—the survival of the fittest. We speak of the survival of the fittest as between units in our industry whereas we should be fortifying ourselves for the survival of the fittest as between industries—maybe the case of Oil versus Electricity.

Who knows the exact possibilities of producing motor fuel from coal or alcohol? Who knows but that tomorrow we will read an announcement of the perfection of a process capable of manufacturing a superior motor fuel for half the present cost of gasoline?

Every individual or company interested directly or indirectly in the petroleum industry could well afford to contribute to a research program designed to develop new and additional markets and, if everyone did contribute, the pro rata cost would be exceedingly small.

No one man, no one company, be the scope of its operations ever so wide, can do the job alone. It is a task for the entire industry working through a collective effort representing every branch and, therefore, every product of our manufacture.

It cannot be done in a day, but a small fraction of the losses sustained by this industry this year, through over production and lack of marketing policy, had it been directed toward the development of entirely new markets would, surely, have brought some results and any results thus obtained would have been of lasting benefit. A dead loss would have been converted to an everlasting asset. Turn the scientists of this country loose and I warrant you that in a comparatively short time they will have the industry oversold. Any product capable of producing the energy that a given unit of petroleum will produce, certainly can be put to many uses unknown to us now.

IN THIS connection I think again of the electric industry. We see them fostering and promoting, through tremendous advertising campaigns, a little old curling iron or some other electric appliance that, in itself, probably does not consume as much electricity as would be required to illuminate a lightning bug. But most surely we would be surprised if we knew the amount of electricity consumed by all the electrical devices that the electrical industry itself has developed in order that we might have more personal comfort and, incidentally, buy more electricity. We have been taught to think in terms of millions of barrels but from now on we must adjust our sights so fine that we will be able to see every possible additional use, be the quantity required ever so small.

The achievements of the cement industry in this direction must convince us of the possibilities. That industry has organized a corporation whose business it is to develop and foster markets for cement products.

THE accompanying article by D. E. Buchanan, vice president of Chestnut & Smith, Tulsa, appeared in the Dec. 24th bulletin of the Western Petroleum Refiners Association. Mr. Buchanan spoke along the same lines to directors of the American Petroleum Institute, meeting in Chicago last month.

As a result, a committee of directors was appointed to consider the desirability of co-operative scientific research, under the direction of the institute, to find wider markets for oil. Members of this committee are Mr. Buchanan, chairman; Henry M. Dawes, president Pure Oil Co.; Axtell J. Byles, president, Tidewater Associated Oil Co.; Amos L. Beaty, chairman of the board, The Texas Co.; J. Howard Pew, president, Sun Oil Co.

NATIONAL PETROLEUM NEWS calls attention of readers to this article to another in this same issue which discusses wider uses for natural gasoline as necessary to bring stability to that branch of the industry. This is by George A. Burrell and R. P. Mase, Burrel-Mase Engineering Co., Pittsburgh, starting on page 67, this issue.

Who would have thought 15 years ago of constructing a 20-story building out of concrete? They all had to be steel, but now you see all over the country skyscrapers constructed of cement. Something else to think about—do you suppose the cement industry has been sitting back with its hands folded while states, counties and municipalities have been covering them up with orders for cement for the construction of paved highways?

Carrying substitution a little farther, we can say that we are supplanting our own fuel oil markets in many cases with natural gas. We see trunk lines for the transportation of natural gas being laid down for long distances, unheard of a few years ago, and these lines, designed to furnish comparatively cheap industrial fuel, will displace large quantities of fuel oil. Even the railroads are very much concerned about the resultant decrease in the tonnage of fuel oil and coal to these centers. How soon will we see such lines spanning the continent? If these installations are proven economically sound, fuel oil in those districts will stand aside.

IT IS said that there are in use today approximately 700,000 oil burners in homes and that these burners will consume something like 45,000,000 barrels of distillate this coming season. I believe, had the petroleum industry, as a whole, supported the burner industry two or three years ago, as the electrical or cement industries most certainly would have done had the matter been one of equal concern to them, there would be twice as many burners now in service. And an oil burner consumes more than five times as much petroleum as an automobile and is in service less than half the time.

This outlet for 45,000,000 barrels of petroleum this year developed in spite of us. We did our best to frighten it away. We practically turned a cold shoulder because we were afraid of a shortage of petroleum and consequent higher prices later on. Had the automotive industry followed our line of reasoning, they should have discontinued manufacturing motor cars two or three times in the past ten years. A comparison of the increase in value of automotive securities as against oil securities renders comment as to the wisdom of their policy unnecessary. First, we think we see a shortage in the offing and before we can turn around we are drowning in over production.

I was amazed a few days ago reading an article which had to do with the large number of new coal tar products that are constantly being brought into the market. The treatise was so technical in character that most of it was over my head but it served to confirm my conviction that the chemical field, if we wish to call it so, could be made a profitable one.

D. E. BUCHANAN
Vice President of Chestnut & Smith Corp., Tulsa

The number of chemical products prepared commercially from coal tar hydrocarbons is so large that it would require many printed pages to even enumerate them, whereas, the commercial chemicals manufactured from petroleum can almost be counted on the fingers of one hand.

I have discussed the matter with chemists of international repute recently and they tell me the methods used in the coal tar industry are also applicable to petroleum products. When it is considered that the raw materials in petroleum in the form of gas oil and fuel oil are valued at less than one-half cent per pound, we realize we have chemical raw material, only approached in cheapness by such substances as lime, sand, salt and raw coal.

I am not advocating that we open up a chain of drug stores but I do believe we must broaden our vision and see something in crude oil except fuel for automobiles and the few other products we now manufacture.

IT SEEMS to me that we owe it to the age in which we live to adapt petroleum to the most beneficial uses possible and surely we owe it to the industry and our stockholders to have our products flowing into as many of the varied channels of commerce as possible.

Substantial commercial and industrial progress is always found following the most economic and beneficial lines. Can it really be said that the burning of gasoline in an internal combustion engine is a superior use, when under present conditions so very little of the potential energy is actually turned into power and, in the course of economic development, may we not be facing something serious in this direction—either a more efficient fuel or more efficient application of the present fuel, the effect of either being to decrease gasoline consumption per unit?

I don't believe we can imagine the value of the good will of the public and the change in public opinion that most surely would follow a genuine attempt to contribute something aside from merely supplying the demand for products developed by others. Nothing has helped the railroads and the public service companies with the public so much as the service they are rendering.

"He profits most who serves best" and merely decorating our boulevards with filling stations is not sufficient.

We are in a rut. Gasoline to us is motor fuel and that's about all. How do we know but that science can make the most wonderful cough syrup in the world out of it and that babies can be made to cry for it. Let's at least find out.

Lansing's Mayor in Arms Over Gasoline Price

CHICAGO, Dec. 31.—"I intend to leave no stone unturned," said Mayor Laird J. Troyer of Lansing, Mich., recently, "in an effort to lower the price of gasoline here now." And so saying he matriculated in the academy of immortals along with William H. McMaster of South Dakota, 1923; Charles Bryan of Nebraska, 1924; Ora L. Spillman of Nebraska, 1925; Austin Peay of Tennessee, 1926, and many others.

Being the mayor of a capital city, Mr. Troyer was quoted extensively in the press. The interview was quoted in part in the December issue of Flash Points, the official organ of the Michigan Oil Men's Association. Evidently, from the mayor's remarks, the city of Lansing is enjoying quantity purchase prices from the Standard Oil Co. of Indiana, probably under Q.D.A. contract. He supported his case as follows, making no allowances for extra cost to the oil companies in their retail sales, such as operating stations, dealers' commissions and so on.

"The city paid 9.1 cents, plus 3 cents tax, for each gallon of gasoline purchased. That sets the price to the city at 12.1 cents per gallon. The retail price is 19.8 cents per gallon, a difference of 7.7. Dividing the profit, 7.7 cents per gallon, by the set price, 12.1 cents per gallon, we see that the oil companies are making a gross profit of slightly more than 63 per cent and that's profiteering."

LOS ANGELES, Dec. 31.—J. S. Mellon, in charge of sales for the Dunn Manufacturing Co. in the Mid-Continent, who spends most of his time traveling from point to point in Oklahoma and Texas, spent most of December in California making his headquarters at the company's head offices at Oxnard.

Decentralization of Operating Control Is Policy of Standard (N. J.)

By V. B. Guthrie
N. P. N. MANAGING EDITOR

NEW YORK, Dec. 29

FORMING of the Standard Oil Developing Co. is another step by the Standard Oil Co. (New Jersey) in reorganization of its activities to allow decentralization of operating control of properties, reserving to the board of directors consideration of major matters of policy.

A change has become necessary, it was felt, from the policy of supervision of practically the entire affairs of the company by the board of directors, with committees of executives in the various departments, the media through which the board kept in touch with the business.

Not only have the company's properties expanded on a vast scale, but they are more widespread geographically than ever before and in all branches of the industry. What the company is doing in this present reorganization is to carry this principle of committee management a step, or several steps, further ahead by forming separate companies in the main departments of the business which will manage these departments subject only to general supervision by the board.

The Standard Oil Development Co. is a recent incorporation in Delaware of the Standard Development Co., which formerly handled technical research and development for the New Jersey interests. It will be a service company for the newly aligned companies coming under the control of the Standard of New Jersey, handling engineering and chemical development work, carrying on major projects of laboratory research, supplying, if necessary, and supervising the technical staffs of the other companies.

E. M. Clark, formerly vice-president of the Standard Oil Co. (New Jersey) in charge of manufacturing, is president of the Standard Oil Development Co., according to the latest issue of the Lamp, official spokesman for the New Jersey interests. Mr. Clark has always been keenly interested in the development of the engineering side of the oil industry, refining particularly. He is himself an inventor and contributed in important measure to the development of two cracking processes. In his new position he will control research and development activities on a scale probably exceeded by only a few companies in the entire industrial world.

Other steps in the reorganization to place control in the hands of executives of the operating companies, except matters of general policy, were the organization of the Standard Oil Co. of New Jersey, incorporated a few months ago in Delaware, to operate the refining, marketing, producing and pipe line properties formerly owned outright by the Standard Oil Co. (New Jersey) which now becomes the holding company for the newly organized companies.

The Standard Oil Co. (New Jersey) turned over to the Standard Oil Co. of New Jersey, incorporated in Delaware, all its refining and marketing business, together with the stock of the Carter Oil Co. and the Tuscarora and Oklahoma Pipe Line companies. It was recognized that the operating of the properties in the producing, refining and marketing branches of the industry—in the case of the properties formerly held outright by the New Jersey interests—was an integral problem and that the same group of men should be in charge and be able to co-ordinate production, manufacturing and distribution to the best interests of the company.

President of Standard Oil Co. of New Jersey, incorporated in Delaware, is Charles G. Black, who had been general manager of various refining properties for the company and later chairman of the manufacturing committee and a director of the New Jersey Standard. Mr. Black's term of service with the Standard Oil interests dates back 44 years. His advancement and that of Mr.

Personnel of Standard's New Alignment

STANDARD OIL COMPANY

Incorporated in New Jersey

OFFICERS

Chairman of the Board: George H. Jones
President: W. C. Teagle
Vice-Presidents: S. B. Hunt, J. A. Moffett
Treasurer: S. B. Hunt
Secretary: C. T. White
Assistant Treasurers: R. P. Resor, C. B. Millard
Assistant Treasurer (Head of Tax Dept.): M. F. Frey
Assistant Secretaries: M. H. Eames, W. F. Quick
Comptroller: L. E. Freeman
Assistant Comptrollers: A. M. Pressinger, C. B. Ware

EXECUTIVE COMMITTEE

George H. Jones, *Chairman*
S. B. Hunt — C. O. Swain
J. A. Moffett — W. C. Teagle

DIRECTORS

C. G. Black, E. M. Clark, W. S. Farish, S. B. Hunt, Walter Jennings, George H. Jones, D. R. Weller, J. A. Moffett, J. A. Mowinckel, Christy Payne, F. H. Bedford, Jr., Heinrich von Riedemann, E. J. Sadler, J. H. Senior, G. H. Smith, C. O. Swain, W. C. Teagle.

STANDARD OIL CO. OF NEW JERSEY

Incorporated in Delaware

OFFICERS

President: C. G. Black
Vice-Presidents: G. W. McKnight, C. G. Sheffield, Richardson Pratt
Secretary, C. T. White
Treasurer, R. P. Resor
Assistant Secretaries: M. H. Eames, W. F. Quick
Assistant Treasurers: C. B. Millard, P. Berau
Comptroller: L. E. Freeman
Assistant Comptrollers: A. M. Pressinger, C. B. Ware

DIRECTORS

F. W. Abrams, E. G. Barber, C. G. Black, C. E. Graff, C. H. Haupt, E. A. Holbein, W. C. Koehler, G. W. McKnight, Richardson Pratt, E. A. Rudigier, C. G. Sheffield, J. A. Van Wynen, R. M. Young.

STANDARD OIL DEVELOPMENT CO.

Incorporated in Delaware

OFFICERS

President, E. M. Clark
Vice-Presidents F. A. Howard, C. H. Haupt, C. A. Straw
Secretary, M. H. Eames
Treasurer, R. P. Resor
Assistant Treasurer P. Berau

DIRECTORS

C. L. Bowman, Roger Chew, E. M. Clark, E. W. Dean, C. R. Ewing, C. A. Straw, Grant McCargo, C. C. Ramsdell, T. R. Parker, C. I. Fiero, G. W. Gordon, C. E. Graff, R. T. Haslam, C. H. Haupt, F. A. Howard, C. O. Johns, H. C. Cooper, H. C. Weiss.

STANDARD SHIPPING COMPANY

Incorporated in Delaware

OFFICERS

President, E. M. Clark
Vice President and Gen. Mgr., R. L. Hague
Vice-President and Asst. Gen. Mgr., R. F. Hand
Secretary, C. T. White
Treasurer, R. P. Resor
Assistant Secretary, M. H. Eames
Assistant Treasurers: C. B. Millard, Philip Berau

DIRECTORS

E. M. Clark, R. L. Hague, R. F. Hand, H. J. Esselborn, C. E. Klitgaard, W. C. Chaloner, W. L. Inslee.

Standard Oil Company (Kentucky) *Uses Wheaton Faucets*

Wheaton Type A Tank Truck Faucet, with which truck shown above is equipped

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This book illustrates and describes the full line of Wheaton Faucets, Valves, Joints, Couplings, Fillers, Nozzles, Fittings, etc. If you haven't a copy, send for one today.

BACK in the winter of 1912-13 the Standard Oil Company (Kentucky) bought one sample Wheaton Type A Tank Faucet. For months they tested it. Then they placed their first order. That was in the days of horse-drawn tanks. From that time till this, they have constantly used Wheaton Type A Tank Faucets—made exactly like that first sample, put through test more than a decade and a half ago. And, no doubt, many of the faucets in that initial purchase have been removed from the old horse-drawn tanks and are still in service on the modern motor equipment like the truck shown above.

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Wheaton

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Clark, of the Standard Oil Development Co., who has been in Standard Oil employ for nearly 40 years, are typical of the policy of the company in the new alignment in advancing the men who have come up through its ranks.

MR. CLARK, for example, started as a clerk in the shipping department at Whiting. He later became general manager of the Bayway refinery and in 1921 was made a director of the Standard of New Jersey.

One other company whose organization has been announced in this new alignment of operating policies is the Standard Shipping Co., which has taken over and is operating the marine equipment formerly owned by different companies. Mr. Clark is president of this company, also, giving his executive ability to deciding important matters of policy, the details being handled by other officers of the company.

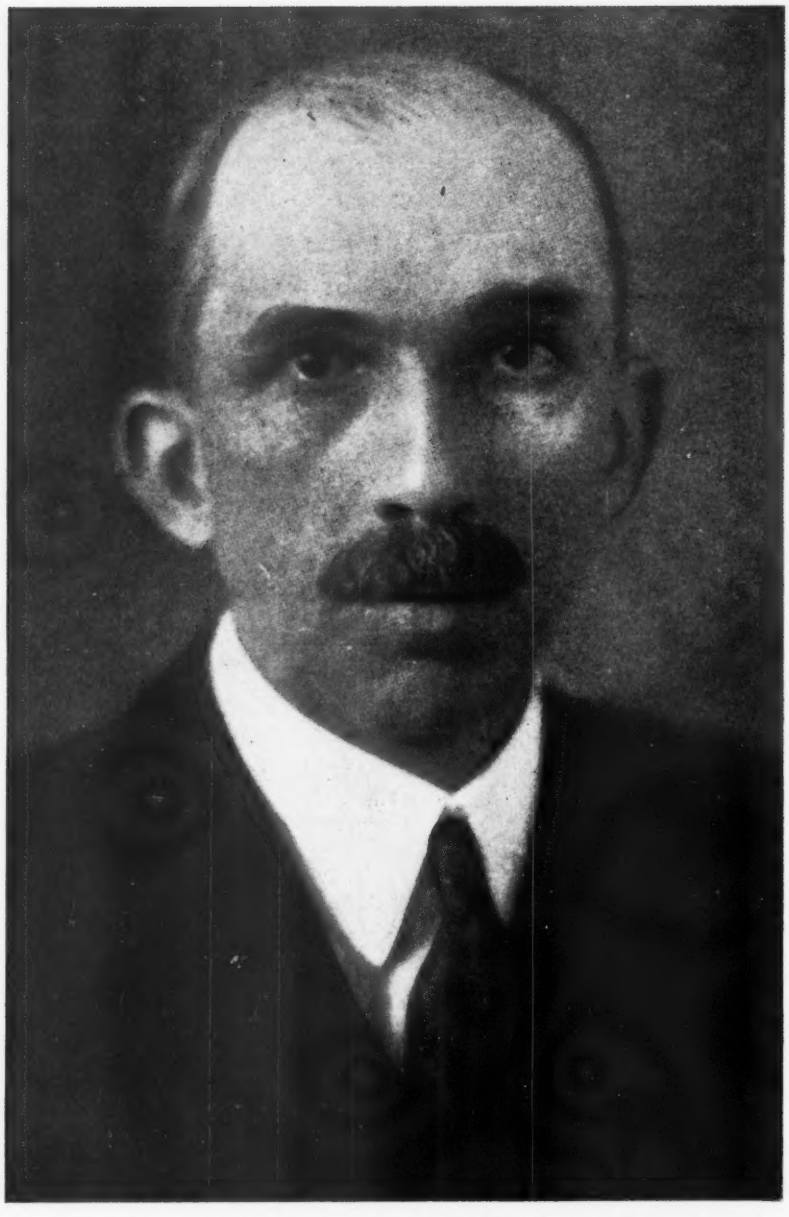
This general reorganization plan will be carried forward later by the formation of new companies to integrate activities formerly carried on by different companies owned by the New Jersey interests. It is said that such a reorganization of the South American properties is under consideration; also organization of a company to carry on the marketing of specialty oil products which have heretofore been handled by the general sales departments of the companies.

In general, what seems to an outsider to be taking place is the organization of activities, which have grown tremendous in scale since the original setup of the company, on parallel planes which will finally coordinate the producing, refining, marketing, and transportation interests of both outright owned subsidiaries of the Standard of New Jersey and also companies controlled by ownership of part of the stock.

This in place of such activities in all branches of the industry being controlled by the subsidiary owning the particular properties.

FOR companies not owned outright but controlled by stock ownership a setup of co-ordinating committees is planned, representation on one committee, for example, including executives from every company operating production properties. These committees will agree on general policies to be followed, so that there will be a unity of policy among all companies under Standard of New Jersey direction.

The Standard Oil Co. (New Jersey) will hold the stock of the new subsidiary companies and its treasury will receive their earnings, according to a statement of the new alignment plan set forth in the Lamp.



E. M. Clark becomes president of the Standard Oil Development Co., and president of the Standard Shipping Co. on the new alignment of the Standard Oil Co. (New Jersey)

It will exercise supervisory control over their operating units, including regulation of their budgets, and will insure all necessary co-ordination among them.

The board membership will include the chief executives of the principal subsidiary or affiliated interests. An executive and finance committee, consisting of five of its members, none of whom will be an officer of any individual unit, will be charged with execution of policies adopted by the full board.

In outside circles it is considered likely that one of the first changes in the physical operations which will come about in the new alignment will be the gradual shifting of refining capacity to the Gulf Coast, to points closer to the fields from which crude supply will come in future years. Existing plants of subsidiary companies or stock controlled companies may be increased, or possibly new plants built.

WHEN the present huge refinery at Bayonne was built, for example, the early Standard Oil policy was being followed of putting the plants near the markets which were to be supplied and transporting crude long distances from the field to the plant. At that time the possibility of cheap transportation of either crude or refined products by water was not foreseen and the Standard seaboard plants had an economic advantage over other plants because of their use of the pipe line system extending from the Mid-Continent fields.

Difficulty of profitable operation of the Bayonne refinery has increased in late years because of the competition of water-transported oil and because of the great increase in real

Vapor Phase Cracking

In view of the present interest in the commercial possibilities and advantages of Vapor Phase Cracking, we believe it important for the petroleum industry to know of our ownership of the following patents, relating thereto:

No. 1,474,475—Application filed June 24, 1916. Patented November 20, 1923. 6 claims.

Claim 1—The method of obtaining gasoline, which consists in vaporizing heavy hydrocarbon oils, causing the vapor to flow slowly at low pressure through and in contact with the walls of a conduit having relatively great length with respect to its cross-sectional area, causing the vapor to frequently and abruptly change its direction of flow through said conduit to prevent the formation of carbon, and heating the walls of the conduit to a temperature sufficiently high to break down the high boiling point compounds of the vapor as it passes through the conduit in contact with the heated walls thereof.

No. 1,474,476—Application filed May 25, 1918. Patented November 20, 1923. 3 claims.

Claim 1—A method of treating vapor of petroleum or the heavier fractions thereof which comprises conducting the vapor under a pressure sufficient only to cause it to advance through a reaction zone of relatively great length and small cross-sectional area, maintaining said vapor during its passage through said reaction zone at a substantially uniform temperature sufficient to break down compounds having high boiling points into compounds having relatively low boiling points, subjecting the stream of vapor during its movement through said reaction zone to successive abrupt impingements and permitting the vapor to flow unobstructedly through the reaction zone portions lying between the successive points of impingement.

Universal Oil Products Company
Owner of the Dubbs Process
310 South Michigan Ave
Chicago, Illinois

estate value of property on which the plant is located. The tax rate is high.

Living costs are higher in the now highly congested district than in other parts of the country and wages, consequently, are higher. Hazards in connection with the operation of refineries in such territories have increased as they became built up and have imposed a greater operating cost on the plant. At present the operating force at Bayonne has been scaled down from 3000 to 2000 and it is not likely this will be increased as market conditions improve, it is said.

Officers of the Standard Oil Development Co., in addition to President Clark, include F. A. Howard, C. H. Haupt and C. A. Straw, vice-presidents. Mr. Howard's first connection with the New Jersey interests was as patent counsel and technical adviser. He organized the Standard Development Co., which the present new company succeeds and is a director in the Ethyl Gasoline Corp., and the Ranney Oil Mining Co. Mr. Haupt has been in charge of the engineering department of the company for some time. Mr. Straw came to the New Jersey company in 1920 to take charge of patent matters and was vice-president of the Standard Development Co. M. H. Eames is secretary, R. P. Resor treasurer and P. Berau assistant treasurer.

THE executive committee consists of Messrs. Clark, Haupt, Howard and Straw, and Roger Chew, E. W. Dean, R. T. Haslam and C. O. Johns. Dr. Chew has been for years prominent in laboratory research work for the New Jersey company and has been manager of the inspection department. Dr. Dean came to the company a few years ago from the Bureau of Mines and has been manager of the inspection laboratory. Dr. Haslam comes to the company from the research laboratory of applied chemistry at the Massachusetts Institute of Technology. Dr. Johns since 1920 has been a director of research in the development department of the Standard of New Jersey.

The Standard Oil Development Co. will be made up of the following departments:

Engineering Department—C. H. Haupt, chief engineer.

Research Laboratory—Dr. C. O. Johns, director.

Standard Inspection Laboratory—Dr. E. W. Dean, director.

Development Department—R. T. Haslam, manager.

Legal Department—C. A. Straw, attorney.

Executive Office Technical Staff—Roger Chew, manager; R. H. Dickson, J. A. Britton, Jr.

The Lamp, in its December issue, carries the following statement as setting forth the purpose and scope of operations of the Standard Oil Development Co.:

"Among the functions of the Standard Oil Development Co. as organized will be to consider and carry out such work along the following lines as may be required or requested by any operating unit of the New Jersey corporation; chemical and physical research, engineering, testing, inspection and general technical work, patent and trademark work and litigation and the conduct of negotiations looking towards the grant of licenses under the company's patent rights.

"It will maintain for these purposes an engineering department, including an engineering physical and metallurgical testing laboratory, a research laboratory (which includes a special fuel testing laboratory and a lubrication laboratory) an inspection laboratory, a development department and a legal department which will handle patent and trademark matters and related legal activities.

The technical staff of the executive office will continue to investigate inventions of possible usefulness in the oil industry, such as new processes, products, devices, apparatus and the like and will determine whether any such inventions are of interest to the Standard Oil Co. (N. J.) or any of its subsidiaries."

Vice presidents of the new Standard Oil Co. of New Jersey, incorporated in Delaware, are G. W. McKnight, C. G. Sheffield and Richardson Pratt. Mr. McKnight has been chairman of the manufacturing committee of the Standard Oil Co. (N. J.) He has been with Standard Oil interests since 1886. Starting in as a stenographer he became secretary to members of the early manufacturing committee before the dissolution.

Mr. Sheffield has been with the New Jersey interests since 1919. He started in the oil business as a lubricating oil salesman on the Pacific coast. During the war he was with the oil division of the fuel administration as director of distribution of oil products. Then he came to the New Jersey company as manager of their fuel oil department.

His new duties will be principally in directing the marketing division of the company. Mr. Pratt entered the oil industry through the Standard of New York after serving in the war. He was later assistant to the president of the Carter Oil Co. In 1926 he became vice-president of the Carter in charge of the New York branch of the company's operations.

Operating executive officers of the Standard Shipping Co. in addition to President Clark are R. L. Hague and R. F. Hand. Mr. Hague is general manager. Starting in with many years' service on the water in various capacities, he later became a naval architect in the Standard Oil Co. of California.

He was director of the repair division of the Emergency Fleet Corp. and lately has been manager of the marine department of the Standard of New Jersey. Mr. Hand is assistant general manager. He has been in charge of the work of chartering and handling vessels and he has been active in the work of studying recodification and revision of the navigation laws of the United States.

I. C. C. Can Effect Conservation, Cullinan Tells Work

CLEVELAND, Jan. 3

OVERPRODUCTION of crude oil may be curtailed through the Interstate Commerce Commission, in the opinion of J. S. Cullinan, pioneer operator in the southwestern oil fields backed by his counsel. Quotations from the lawyers' opinion, given in response to questions by Mr. Cullinan, are contained in a letter he wrote Secretary of the Interior Work for consideration by Dr. Work's Committee of Nine which is considering ways and means to effect conservation of petroleum.

The I. C. C. would not have the power to limit production itself, because production is a domestic or intrastate affair, said the lawyers, whom Mr. Cullinan describes as prominent. But the commission has the power to limit interstate shipments of oil whether made by rail or pipe line and such limitation from a new flush pool is usually possible because these pools at most times are in wildcat territory away from the markets for the oil. Only pipe line capacity sufficient to meet current market needs could be authorized for construction.

Mr. Cullinan suggested that this legal firm be employed or that oil men who are in sympathy with means of getting relief from overproduction might be solicited to work through Dr. Work's committee or with the I. C. C. direct to get "prompt and effective relief on the most pressing phase of the problem, following which the other problems which the public, the industry, and your commission (committee of nine) are interested in correcting, could be thrashed out to constructive conclusions."

The lawyers also wrote that Congress had the right, under its power

to prosecute war, to regulate petroleum production to the end of conserving it for military needs. Modern warfare is dependent on oil, they wrote, and "to say that a government is helpless in time of peace to make wise preparation for potential war, is to declare that government wholly impotent, and at the mercy of a foreign invader. . . .

"In wartime a country may not depend upon supplies from other countries. It must rely on its own natural resources to supply its needs. The government could not stand idly by and see reckless destruction of this essential commodity to such an extent as to endanger its supply in time of war. It is only a question of degree. If the national safety is possibly endangered by waste and destruction of these natural resources, it seems most extraordinary if the federal government could not, by proper regulation and prevention of waste, take measures to protect itself against the danger of lack of adequate oil supplies in event of war."

Mr. Cullinan has been a producer of petroleum in the southwest for more than 30 years. For 13 years before he went to Corsicana in 1897 he was affiliated with production activities in Pennsylvania and Ohio fields. He organized the first pipe line and refining company in Texas in 1897. It was styled at first J. S. Cullinan & Co. and later the Corsicana Refining Co. It was the nucleus from which grew the Magnolia Petroleum Co., present subsidiary of the Standard Oil Co. of New York.

Mr. Cullinan disposed of his Corsicana Refining Co. holdings in 1902 and went to Beaumont where a year later he joined John W. Gates and others in organizing The Texas Co. of which he was president until 1913.

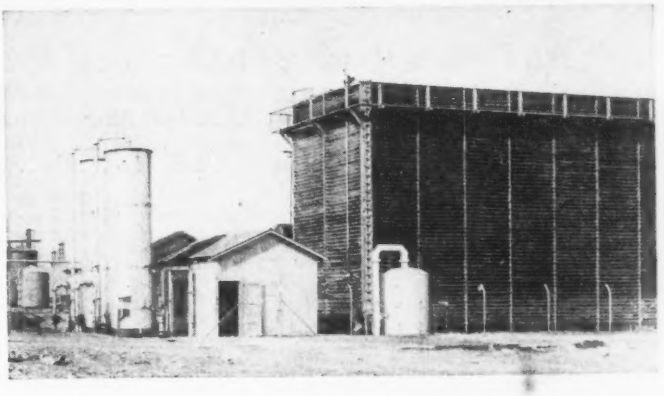
Mr. Cullinan afterward organized the American Republics Corp. as a holding company for his various interests. American Republics Corp. has more than 20 subsidiaries, including Petroleum Iron Works, Pennsylvania Car Co., Pennsylvania Tank Line, Petroleum Supply Co., American Petroleum Co., Republic Production Co., Federal Petroleum Co., and Papoose Oil Co.

American Republics also holds a large block of the new preferred stock of the Galena Signal Oil Co. of Pennsylvania and in the Texas subsidiary of the Pennsylvania company.

* * *

WASHINGTON, Jan. 3.—Little has been written to date to Dr. Work's Committee of Nine suggesting ways and means of accomplishing petroleum conservation, it is reported. The contribution of J. S. Cullinan is the most important letter received which has become public. Suggestions may be sent to E. S. Rochester, secretary of the committee, Room 5139, Interior building, Washington, previous to Jan. 10. The committee will begin public hearings Jan. 23.

Billions *of* Bubbles



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J. A. Campbell

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Natural Gas Engineer

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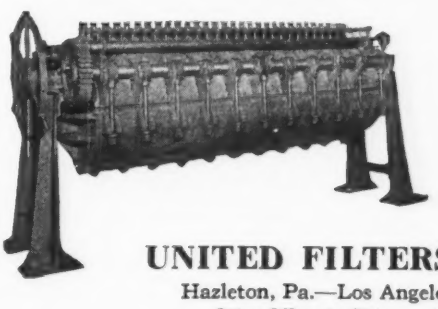

WHEN they tried to commercialize the contact process, there was one big stumbling block—filtration.

Until the Sweetland Pressure Filter was adapted to this work, it looked as if it could not be developed into a practical process.

More than one hundred refineries are using this process and with it, Sweetland Filters.

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Compilation Of Mid-Continent Refinery Operations

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National Petroleum News

Mid-Continent Refinery Operations Week Ended December 30 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	North La.-Ark.	Total Week Ended Dec. 30	Total Week Ended Dec. 2
Plants Reporting	12	28	27	12	79	79
Crude Capacity (bbls.)	92,000	157,200	104,500	54,900	408,600	408,600
Cracking Capacity	30,700	52,600	16,200	22,700	122,200	122,200
Da. Av. Crude Runs	52,611 + 3.9	100,606 + 1.4	60,766 — 7.0	41,813 — 3.5	255,796 — 1.1	256,813
Da. Av. Other Oils	5,610 — 10.4	— 700	6,400 — 16.1	2,332 +235.5	13,642 — 18.0	20,060
GASOLINE—Gallons						
Stocks, Dec. 23	11,481,000	42,153,000	19,573,000	3,725,000	76,932,000	66,701,000
Prod. 12-23 to 12-30	7,892,000 + 3.4	16,004,000 + 6.2	6,985,000 — 5.0	3,918,000 + 19.4	34,799,000 + 4.4	34,326,000
Ship. 12-23 to 12-30	7,776,000 + 9.0	12,410,000 + 7.1	7,243,000 + 12.4	3,671,000 + 22.8	31,100,000 + 10.5	35,019,000
Stocks Dec. 30	11,597,000 + 1.0	45,747,000 + 8.5	19,315,000 — 1.3	3,972,000 + 6.6	80,631,000 + 4.8	66,008,000
Ratio Sales to Prod.	98.5%	77.5%	103.7%	93.7%	89.4%	102.0%
KEROSENE—Gallons						
Stocks, Dec. 23	4,077,000	7,195,000	1,862,000	607,000	13,741,000	14,333,000
Prod. 12-23 to 12-30	1,538,000 — 1.6	2,456,000 — 9.5	1,349,000 — 12.9	770,000 + 18.8	6,113,000 — 5.6	6,302,000
Ship. 12-23 to 12-30	1,631,000 — 8.9	1,672,000 — 41.6	1,143,000 — 33.7	753,000 + 4.1	5,199,000 — 26.8	6,087,000
Stocks, Dec. 30	3,984,000 — 2.3	7,979,000 + 10.9	2,068,000 + 11.1	624,000 + 2.8	14,655,000 + 6.7	14,548,000
Ratio Sales to Prod.	106.0%	68.1%	84.7%	97.8%	85.0%	96.6%
STOVE DISTILLATE—Gallons						
Stocks, Dec. 23	3,260,000	5,276,000	1,059,000	57,000	9,662,000	13,764,000
Prod. 12-23 to 12-30	156,000 — 54.1	759,000 + 22.6	282,000 + 25.3	56,000 +833.3	1,253,000 + 5.3	1,058,000
Ship. 12-23 to 12-30	425,000 — 37.5	898,000 — 10.6	383,000 — 50.2	67,000 +1575.0	1,773,000 — 27.9	1,586,000
Stocks, Dec. 30	2,991,000 — 8.3	5,137,000 — 2.6	968,000 — 9.4	46,000 — 19.3	9,142,000 — 5.4	13,236,000
Ratio Sales to Prod.	272.4%	118.3%	135.8%	119.6%	141.5%	149.9%
GAS OIL—Gallons						
Stocks, Dec. 23	7,797,000	39,593,000	13,572,000	7,162,000	68,124,000	77,088,000
Prod. 12-23 to 12-30	1,305,000 — 4.3	1,695,000 + 3.9	753,000 — 28.0	1,510,000 — 31.6	5,264,000 — 15.7	9,329,000
Ship. 12-23 to 12-30	1,393,000 — 10.6	2,425,000 — 1.4	540,000 — 63.4	1,254,000 — 48.2	5,612,000 — 29.1	10,488,000
Stocks, Dec. 30	7,710,000 — 1.1	38,863,000 — 1.8	13,785,000 + 1.6	7,418,000 + 3.6	67,776,000 — 0.5	75,929,000
Ratio Sales to Prod.	106.7%	143.1%	71.7%	83.0%	106.6%	112.4%
FUEL OIL—Gallons						
Stocks, Dec. 23	14,396,000	36,695,000	38,882,000	9,402,000	99,375,000	105,838,000
Prod. 12-23 to 12-30	6,345,000 + 13.0	6,532,000 — 4.7	8,253,000 — 7.9	6,399,000 + 1.0	27,529,000 — 0.9	24,913,000
Ship. 12-23 to 12-30	6,407,000 — 1.9	6,544,000 — 33.9	8,549,000 — 11.2	5,075,000 — 21.8	26,575,000 — 18.3	26,899,000
Stocks, Dec. 30	14,334,000 — 0.4	36,683,000 — 0.03	38,586,000 — 0.8	10,726,000 + 14.1	100,329,000+ 1.0	103,852,000
Ratio Sales to Prod.	101.0%	100.2%	103.6%	79.3%	96.5%	108.0%

Gasoline Produced by Various Methods, Week Ended December 30

	Kansas	% of Total	Oklahoma	% of Total	Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	4,777,000	60.5	11,457,000	71.6	5,350,000	76.6	1,707,000	43.6	23,291,000	66.9
Cracked	2,456,000	31.1	3,322,000	20.8	1,347,000	19.3	1,581,000	40.3	8,706,000	25.0
Natural	659,000	8.4	1,225,000	7.6	288,000	4.1	630,000	16.1	2,802,000	8.1
Total	7,892,000		16,004,000		6,985,000		3,918,000		34,799,000	

+ or — columns are % change over previous week.

Mid-Continent Gasoline Stocks Increase

Staff Special by Telegraph
TULSA, Jan. 4

STOCKS of gasoline at 79 refineries in the Mid-Continent field increased 3,700,000 gallons during the last week in 1927 according to reports gathered by NATIONAL PETROLEUM NEWS. Total stocks Dec. 30 were 80,631,000 gallons as compared with 76,932,000 gallons on Dec. 23 and 66,757,000 gallons on Dec. 31, 1926. At the current rate of shipment stocks represent 18 days supply. At the close of 1926 gasoline stocks at the same group of plants represented 16.5 days' supply at that current rate of shipment.

Gasoline shipments improved somewhat last week in spite of the extremely cold weather. Total shipments were 31,100,000 gallons as compared with 28,156,000 gallons in the week ended Dec. 23, an increase of

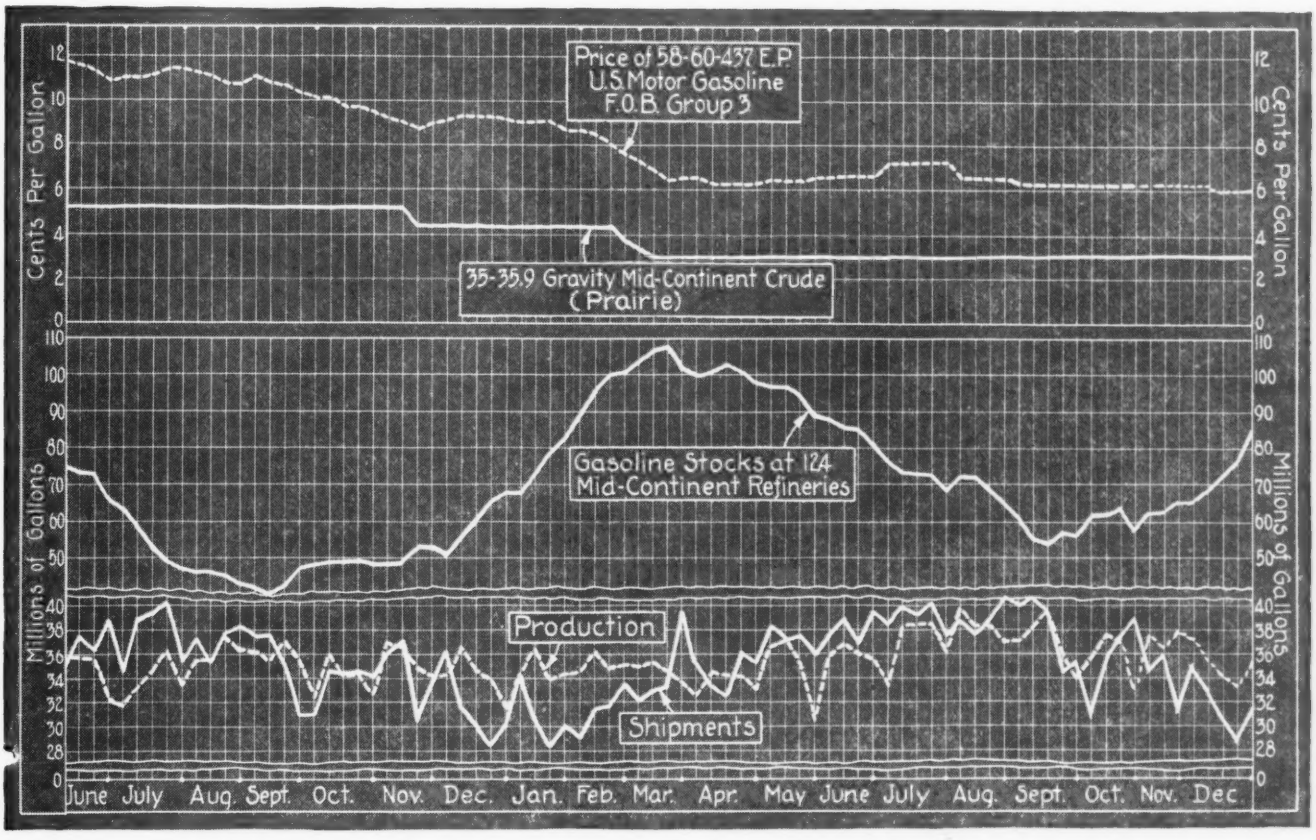
Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended Dec. 30. Change in stocks figured from Dec. 2.

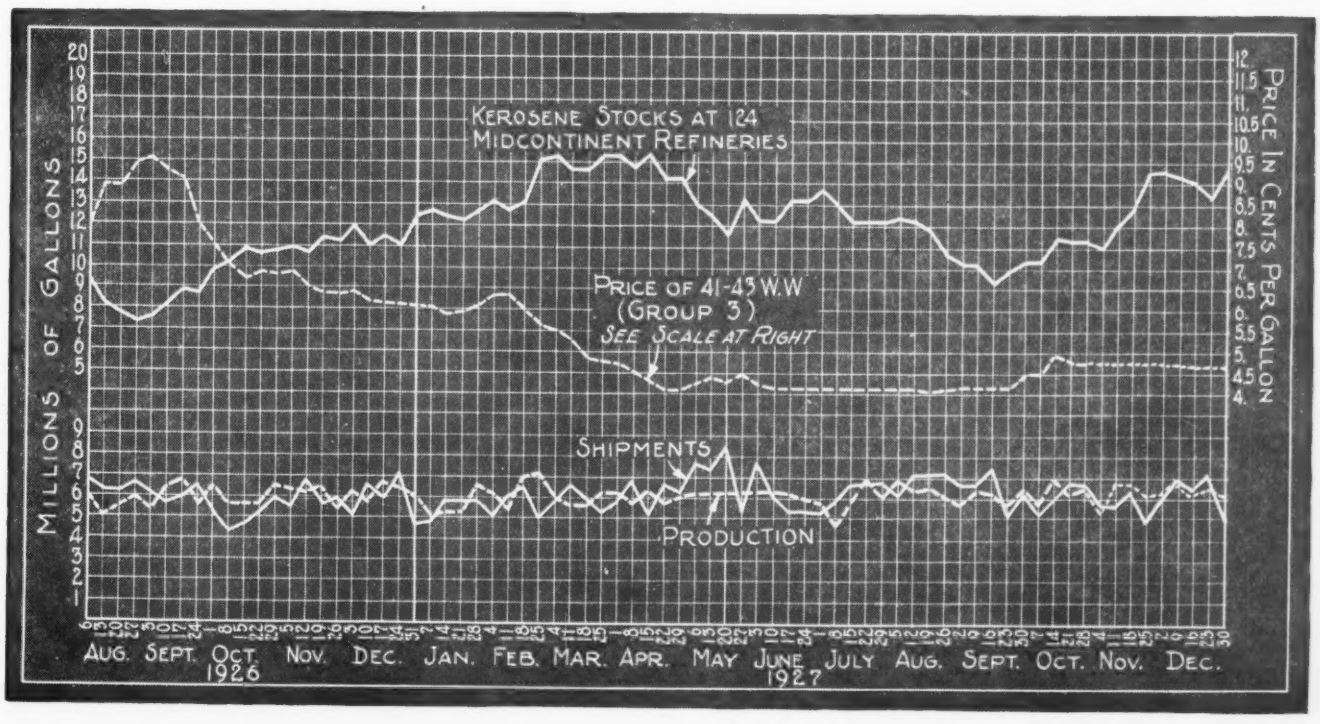
	Gallons
GASOLINE	
Production	137,158,000
Shipments	122,535,000
Net change in stocks	+14,623,000
Ratio sales to production	89.3%
KEROSENE	
Production	25,064,000
Shipments	24,957,000
Net change in stocks	+107,000
Ratio sales to production	99.6%
STOVE DISTILLATE	
Production	4,690,000
Shipments	8,784,000
Net change in stocks	—4,094,000
Ratio sales to production	187.3%
GAS OIL	
Production	22,572,000
Shipments	30,725,000
Net change in stocks	—8,153,000
Ratio sales to production	136.1%
FUEL OIL	
Production	111,720,000
Shipments	115,243,000
Net change in stocks	—3,523,000
Ratio sales to production	103.2%

Barometer of Mid-Continent Refinery Market—Week Ending December 30

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News

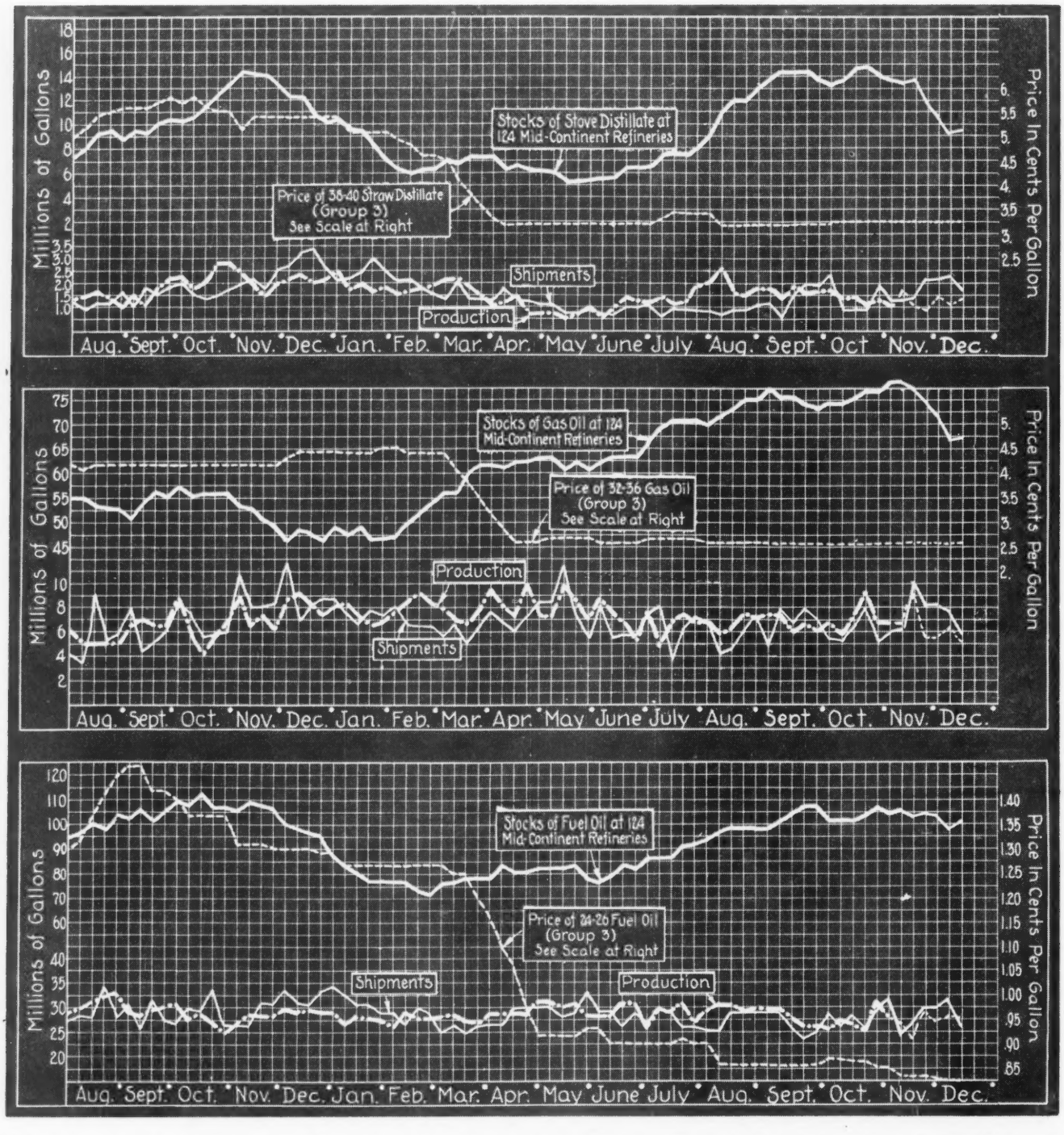

Price of 58-60-437 E.P. U.S. Motor Gasoline F.O.B. Group 3
35-35.9 Gravity Mid-Continent Crude (Prairie)
Cents Per Gallon
Gasoline Stocks at 124 Mid-Continent Refineries
Millions of Gallons
Production
Shipments
June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date shown in table on opposite page


KEROSENE STOCKS AT 124 MIDCONTINENT REFINERIES
PRICE OF 41-43 W.W (GROUP 3) SEE SCALE AT RIGHT
SHIPMENTS
PRODUCTION
MILLIONS OF GALLONS
PRICE IN CENTS PER GALLON
AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1926
1927

Barometer of Mid-Continent Refinery Market—Week Ending December 30

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 124 Plants to National Petroleum News


Millions of Gallons
Price In Cents Per Gallon
Stocks of Stove Distillate at 124 Mid-Continent Refineries
Price of 38-40 Straw Distillate (Group 3) See Scale at Right
Shipments
Production
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct Nov. Dec.
Millions of Gallons
Price In Cents Per Gallon
Stocks of Gas Oil at 124 Mid-Continent Refineries
Price of 32-36 Gas Oil (Group 3) See Scale at Right
Production
Shipments
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
Millions of Gallons
Price In Cents Per Gallon
Stocks of Fuel Oil at 124 Mid-Continent Refineries
Price of 24-26 Fuel Oil (Group 3) See Scale at Right
Shipments
Production
Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

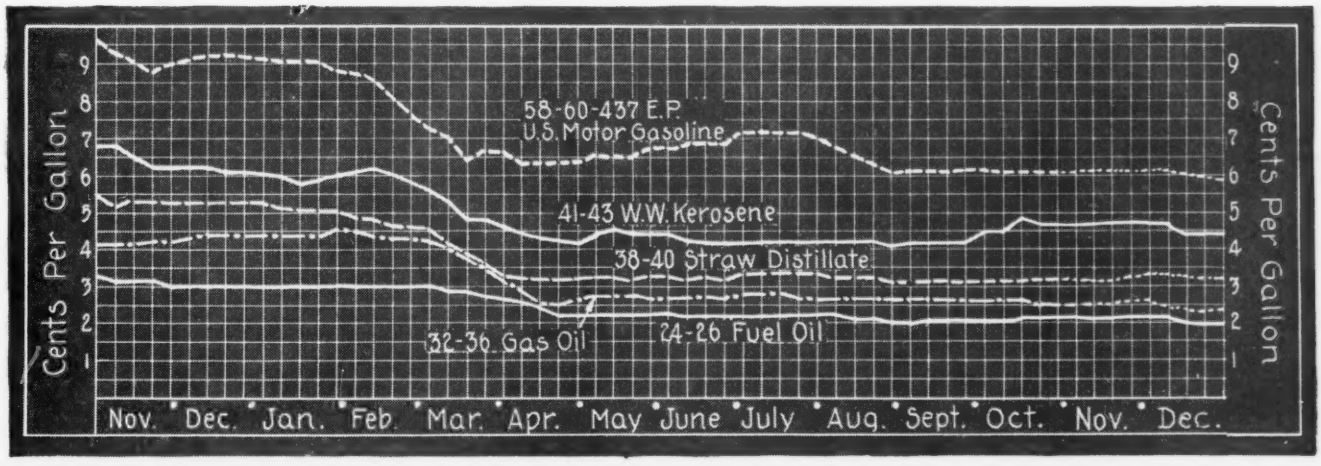
10.5 per cent. The increase in shipments was general through the field although the southern group of plants reported the heaviest increase. Kansas gasoline shipments increased 9 per cent, Oklahoma 7.1 per cent, North and Central Texas 12.4 per cent and North Louisiana and Arkansas 22.8 per cent.

Both Oklahoma and Kansas reported increases in crude charges to stills while Texas and Louisiana-Arkansas refiners showed reductions. For the field as a whole crude runs were cut 2,733 barrels daily average or 1.1 per cent to an average of 255,796 barrels of crude per day.

Kerosene shipments dropped off about 25 per cent to 5,199,000 gallons from 7,104,000 gallons the previous week. Production was cut slightly to 6,113,000 gallons. Total stocks of kerosene Dec. 30 were 14,655,000 gallons, an increase of 914,000 gallons in the week. On Dec. 31, 1926 the same group of plants held 12,536,000 gallons of kerosene in storage, 2,100,000 gallons less than at present. In the four weeks just closed kerosene stocks were almost steady, increasing only 107,000 gallons.

Shipments of stove distillate dropped off, along with kerosene, in the last week of the year. Total shipments for the week were 1,773,000 gallons while production was 1,253,000 gallons. Stocks were cut 520,000 gallons to 9,142,000 gallons. A year ago stove distillate stocks were 10,313,000 gallons, about 1,200,000 gallons greater than at present. In the past four weeks stove distillate stocks have been cut 4,094,000 gallons.

Current Prices of Principal Mid-Continent Refined Products


Cents Per Gallon
58-60-437 E.P. U.S. Motor Gasoline
41-43 W.W. Kerosene
38-40 Straw Distillate
32-36 Gas Oil
24-26 Fuel Oil
Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

Prices shown are on Group 3 basis and extended to date shown in Refinery Market Tables in Market Section of this Issue

Although gas oil business likewise suffered during the holidays, refiners were able to keep goods moving rapidly enough to draw 350,000 gallons from storage. Total stocks on Dec. 30 were 67,776,000 gallons as compared with 46,971,000 gallons a year ago. The increase in the year may be attributed largely to decreased cracking operations.

The holiday season cut into fuel oil business also bringing shipments for the week down to 26,575,000 gallons as compared with 32,545,000 gallons the previous week, a reduction of 18.3 per cent. Production at all plants was off 0.9 per cent to 27,529,000 gallons so that stocks increased only 1,000,000 gallons to 100,329,000 gallons. A year ago fuel oil stocks at the same plants totaled 89,525,000 gallons.

Second Howard County Deep Lime Well Gets Oil

HOUSTON, Jan. 2

Second deep pay commercial well, in Howard county, Texas, in W&NW sec. 136, is being deepened to the level of the Magnolia Petroleum Co.'s Dora Roberts discovery after swabbing 168 barrels in one hour at 2570 feet. The Magnolia discovery, which it offsets, came in about two months ago for pinched-down initial production of 47 barrels an hour at approximately 2900 feet.

The new well is being drilled by Owen & Sloan, discoveries of the shallow Chalk pool area, in the western part of which the deep lime pay was found. Steve S. Owen, of Tulsa, one of the partners, drilled the discovery well of the Westbrook pool, in northern Mitchell county, for the old Underwriters Producing & Refining Co., in 1921. Later, the Westbrook pool properties were sold to the California Co., Rocky Mountain and Texas subsidiary of the Standard Oil Co. of California, which now operates them in conjunction with the Colorado-Texas Refining Co., at Colorado City.

Trunk pipeline outlet from the Howard county area is provided by the Magnolia, which recently built its west Texas-to-Ranger 8-inch system through the territory.

The producing horizon of the Magnolia discovery is similar to that found in the Iatan field of the same company, about 15 miles northeast in Mitchell county, in the general direction of the Westbrook development area. Its higher productivity, however, checks more nearly with the prolific yields of wells in the Big Lake field of Reagan county, about 60 miles south.

In both the Iatan and the Big Lake fields a first productive horizon in the upper part of the lime formation yields some oil; generally, however, in smaller quantities in the northern territory than in Reagan county. Almost invariably the 2600-foot horizon in the Iatan field has been passed up in completing wells at the 2860-2900 foot level; in the Big Lake field, however, considerable oil has been produced from a few wells exploited at drilling depths of approximately 2450 feet.

As in other areas of the west Texas Permian salt basin, the crude produced in the Howard county deep lime wells contains a marked quantity of sulfur. The gravity of the crude also is generally comparable with oil from west Texas fields other than Big Lake, where gravities range from 32 to 38 degrees, A.P.I. Most other west Texas fields yield crude testing from 26 to 30 degrees, A.P.I., as compared with 26.7 degrees in the Dora Roberts discovery.

Analysis of crude from the Dora Roberts well shows a cold test of 24 degrees; Saybolt viscosity at 70 degrees Fahr., of 128, and at 100 degrees Fahr., of 73.

A detailed distillation test follows:

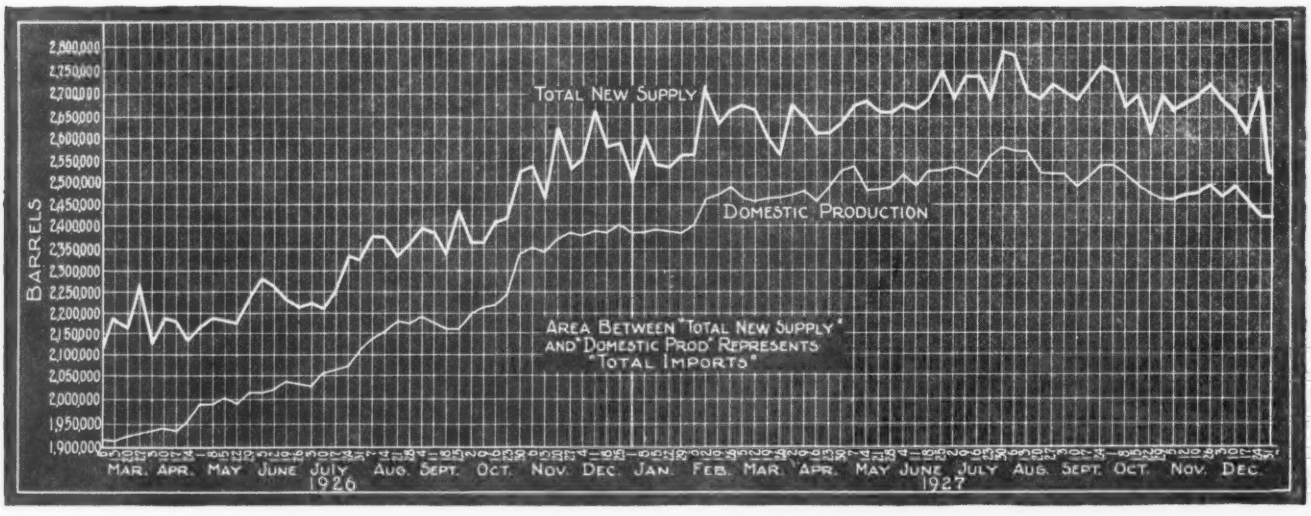
Distillation Tests on Howard County, Texas, Deep Lime Crude

Atmospheric Distillation
Volume charged — 300 C.C.

Temperature Cut degs., Fahr.	Product	C.C. Vol.	A.P.I. Grav.	Yield Pct.
Up to 392	Gasoline	60	54.1	20.0
392 — 527	Kerosene	50	38.0	16.7
	Vacuum Distillation at 40 M.M.			
Up to 437	Gas Oil	22.2	30.1	7.4
437 — 527	Light Lub. Dist.	40.4	26.0	13.5
527-572	Med. Lub. Dist.	16.3	23.0	5.4
A.P.I. Gravity of residuum — 10.5.				
				Engler Dist.
	Gasoline (Stratford)		26.2 pct.	
	Gravity	53.0		10 — 184
	I.B.I.	132		20 — 218
2000 C.C. chg.	E.P.	432		30 — 242
Physical Tests				40 — 268
On Crude—	Kerosene (Stratford)		1.3	50 — 290
	Gravity	39.0		60 — 312
Vis. at 70° — 128	Flash	160		70 — 340
Vis. at 100° — 73	Fire	180		75 — 350
C.T. — 24				80 — 368
B.S. — .15	Gas Oil		8.9	85 — 374
Water — trace	Gravity	34.9		90 — 390
	Flash	170		95 — 412
	Fire	195		E.P. — 432
	Wax Distillate		17.9	
	Gravity	29.1		
	Flash	225		
	Fire	275		
	Vis.	47 at 100°		
	C.T.	50		
	Bottoms		42.2	
	Gravity	12.8		
	Flash	400		
	Fire	465		
	Vis.	237 at 210°		
	Loss		1.5	

Sulphur content of gasoline — .257 pct.
To sweeten gasoline — 171 lbs. to 1000 bbls.

Daily Average Crude Oil Production and Imports



Daily average gross output of United States, by fields, for week ending with dates below as compiled by American Petroleum Institute

PRODUCTION SUMMARY

	Dec. 31	Dec. 24
Production east of Rockies	1,794,950	1,810,900
Decrease		15,950
Total production in U. S.	2,419,750	2,432,200
Decrease		12,450
Crude oil imports	102,143	278,571
Decrease		176,428
Total crude supply	2,521,893	2,710,771
Decrease		188,878

OKLAHOMA

	Dec. 31	Dec. 24
North Braman	3,100	3,100
South Braman	1,850	1,950
Blackwell	3,850	3,850
Hubbard	2,800	2,850
Thomas	1,900	1,900
Tonkawa	15,150	15,200
Garber	10,450	10,450
Burbank	38,600	36,850
Osage, outside Burbank	29,700	29,800
Watchorn	1,300	1,350
Cushing	21,050	21,050
Yale Jennings	9,950	9,100
Davenport	2,350	2,400
Bristow-Slick	24,600	24,600
North Okmulgee	16,000	16,000
Lyons-Deaner	6,200	6,200
Stroud	1,250	1,250
Cromwell	10,650	10,600
Papoose	5,600	5,650
Wewoka	8,950	10,450
Seminole	56,650	55,650
Bowlegs	107,950	108,450
Searight	21,150	21,300
Little River	38 150	38,750
Earlsboro	137,450	143,100
Duncan district	6,800	6,650
Graham	6 250	6,450
Fox	1,850	1,900
Healdton	14,600	14,700
Hewitt	9,200	9,400
Scholem Alechem	12,800	12,350
Others	74,000	72,450
Total Oklahoma	701,250	705,750
Decrease		4,500

KANSAS

	Dec. 31	Dec. 24
Greenwood County	31,000	31,000
Florence-Covert	1,450	1,450
Peabody-Elbing	3,750	3,750
Eldorado-Towanda	14,250	14,250
Augusta-Fox-Bush	4,100	4,150
Rainbow Bend	2,050	2,100
Russell	2,300	2,300
Churchill	12,150	12,550
Others	36,800	34,000
Total, Kansas	107,850	105,550
Increase		2,300

NORTH LOUISIANA

	Dec. 31	Dec. 24
Homer	4,550	4,500
Haynesville	6,750	6,600
Caddo, light	11,900	12,050
Caddo, heavy	4,050	3,750
DeSoto, Red River	4,200	4,200
Elm Grove	600	650
Bellevue	1,050	1,100
Cotton Valley	4,800	4,800
Urania	7,850	8,500
Pleasant Hill	850	850
Total, North Louisiana	46,600	47,000
Decrease		400

ARKANSAS

	Dec. 31	Dec. 24
El Dorado	5,900	6,250
Smackover, light	9,200	9,350
Smackover, heavy	71,150	71,550
Stephens	1,150	1,150
Nevada	3,100	3,350
Lisbon	2,700	2,600
Others	150	100
Total, Arkansas	93,350	94,350
Decrease		1,000

TEXAS (Outside Gulf Coast)

	Dec. 31	Dec. 24
Hutchinson County	52,400	55,300
Carson County	7,700	7,900
Gray County	18,800	19,300
Wheeler County	1,300	1,350
Others	50	50
Total, Panhandle District	80,250	83,900
Decrease		3,650

North Texas

Burkburnett	11,950	11,800
Electra	11,650	11,700
Iowa Park and K-M-A	1,900	1,900
Wilbarger	11,000	11,100
Archer County	22,750	22,900
Montague-Cooke	15,050	15,250
Others	700	700
Total, N. Texas	75,000	75,350
Decrease		350

West Central Texas

Stephens County	8,000	8,050
Eastland-Desdemona	9,300	9,150
Brown County	17,000	17,250
Coleman County	1,000	1,000
Callahan County	4,300	4,250
Shackleford County	4,950	5,000
Young County	10,150	10,300
Throckmorton County	1,000	1,050
Palo Pinto County	450	450
Others	1,450	1,650
Total, W. Central Texas	57,600	58,150
Decrease		550

West Texas

Jones County	1,350	1,400
Mitchell and Scurry Counties	3,400	3,300
Howard County	6,650	5,800
Reagan County	22,800	22,700
Crane and Upton Counties	111,400	119,000
Crockett County	4,250	3,400
Pecos County	48,350	44,300
Winkler	60,000	62,000
Others	2,400	2,550
Total, West Texas	260,600	264,450
Decrease		3,850

East Central Texas

Mexia	8,350	8,400
Currie	600	600
Richland	700	700
Wortham	2,250	2,250
Corsicana-Powell	13,000	13,050
Nigger Creek	1,900	1,950
Total, East Central Texas	26,800	26,950
Decrease		150

Southwest Texas

Luling	13,850	14,000
Lytton Springs	1,600	1,600
Somerset	800	800
Laredo District	7,350	7,450
Piedras Pintas		400
	400	
Others	400	400
Total, Southwest Texas	24,400	24,650
Decrease		250
Total, Texas—(Outside Gulf Coast)	524,650	533,450
Decrease		8,800

GULF COAST

Coastal Texas

	Dec. 31	Dec. 24
West Columbia	8,500	8,950
Damon Mound	800	900
Big Creek	2,150	2,150
Boling	2,100	2,250
Blue Ridge	3,900	3,800
Pierce Junction	11,800	12,000
Humble	1,900	1,950
Goose Creek	7,400	7,500
South Liberty	2,300	2,000
Hull	12,450	12,400
Saratoga	1,000	1,000
Batson	1,300	1,300
Sour Lake	3,900	3,850
Spindletop	53,400	53,500
Orange County	4,200	4,150
Others	3,350	3,650
Tot. Coastal Tex.	120,450	121,350
Decrease		900

Coastal Louisiana

	Dec. 31	Dec. 24
Vinton	4,750	4,750
Lockport	4,800	4,800
Evangeline	1,150	1,200
Edgerly	2,850	2,600
Others	1,500	1,550
Total, Coastal Louisiana	15,050	14,900
Increase		150
Total Gulf Coast	135,500	136,250
Decrease		750

ROCKY MOUNTAIN

Wyoming

Salt Creek	38,950	42,550
Grass Creek	2,500	2,500
Elk Basin	900	650
Big Muddy	2,700	2,700
Lost Soldier	2,700	2,600
Rock River	2,550	2,750
Lance Creek	600	650
Teapot Dome	.....	.....
Others	3,550	3,500
Total, Wyoming	54,450	57,900
Decrease		3,450

Montana

Cat Creek	1,850	1,850
Sunburst	9,500	9,500
Others	150	150
Total, Montana	11,500	11,500

Colorado

Moffat (Craig)	1,150	1,200
Fort Collins	3,150	3,150
Florence	950	700
Others	550	1,300
Total, Colorado	5,800	6,350
Decrease		550

New Mexico

Table Mesa	400	.....
Artesia	1,450	1,400
Hogback	650	600
Rattlesnake	900	200
Others	100	100
Total, N. Mexico	3,500	2,300
Increase		1,200
Total, Rocky Mountain	75,250	78,050
Decrease		2,800

California

Santa Fe Springs	38,500	38,500
Long Beach	118,000	113,000
Huntington Beach	60,500	61,000
Torrance	20,000	20,000
Dominguez	13,500	14,000
Rosecrans	8,000	8,500
Inglewood	31,800	31,800
Midway-Sunset	81,000	81,000
Ventura Avenue	52,000	51,500
Seal Beach	42,500	43,000
Others	159,000	159,000
Total California	624,800	621,300
Increase		3,500

Eastern

(Including Ill., Ind., Ky., O., W. Va., Pa., and N. Y.)	110,500	110,500

Oklahoma Producing Industry Starts 1928 With a Little Optimism

By Lawrence E. Smith
N. P. N. STAFF WRITER

TULSA, Dec. 31

THE Mid-Continent producing industry closed its desk at noon today, locking up the history of 1927. It is due to open the desk again on Tuesday morning, with a new year just started. It cannot, however, dispose of the 1927 record so easily. The bills that were incurred in the past year, the financial burdens and the obligations are still unpleasant reminders of a twelve-month period of uneconomic operation.

Nothing magical surrounds the mere turn of the year and next week will go on just as last week did. January 1 is, therefore, merely a point to look forward from. Not that the situation has changed or conditions become better or worse with the beginning of 1928, but such date is a convenient point in the journey to stop and survey the road ahead.

Solely from the Mid-Continent point of view and again, solely from the standpoint of production of crude oil, there is a little better tone to the situation than there was this time a year ago. Then the Seminole area was being revealed in its true light —as an area of fearful possibilities. It had produced by Jan. 1, 1927, more than 11,000,000 barrels and its daily production when the year opened stood at 160,000 barrels. The Earlsboro pool was getting a good start and Bowlegs had just been discovered. Little River was unkown. The huge drilling campaign indicated that a terrific peak of production might be attained.

Crude oil prices were crashing. Dire were the predictions as to what would happen before the year ended. Most of the fearful prophecies came true. The Seminole district ran up to a peak of 527,400 barrels late in July. During the year the district produced more than 125,000,000 barrels.

We go into the new year with a vastly changed condition. The Seminole district is on the downgrade in production, standing now at around 350,000 barrels and each day sees a further slipping in the output. The drilling campaign is drawing to a close. There has been no reduction in price for several months and there seems to be no occasion for one, again viewing it wholly as a Mid-Continent matter. Thoughts of West Texas, however, are bound to intrude in these calculations.

True, the start of the new year sees seven spots in the Seminole district where discovery wells have been drilled. With the showing each of these made in initial production, at least six of them a year ago would have started a campaign of at least 50 wells immediately surrounding.

Something has come over the producing industry, however, and this something can be marked down on the credit side of the year's achievements. There is manifest now a desire to keep the lid tight on every new area. Operators talk things over far more extensively and to much better purpose than they did a year ago. In the meetings held in recent weeks they come together determined to find the way out of any troublesome situation.

BECAUSE of this spirit, we find every one of the seven new pools held down. The discovery well in each instance is being produced to 100 barrels or less daily and the drilling campaigns have not been started. The present agreement runs to March 1, but it is believed that it will be extended when that date arrives.

Evidence of the authenticity of the shut-down on these new pools is seen in the production figures revealed today by Umpire Ray M. Collins. These are daily averages for the period Dec. 1-15:

Gypsy Oil Co., 7-8-6, 102.05 barrels.

Gypsy Oil Co., 33-8-6, 49.66 barrels.

Mid-Continent Petroleum Corp., 5-7-7, 51 barrels from the Viola lime with Wilcox sand production entirely shut in.

Independent Oil & Gas Co., 22-7-6, 106 barrels.

Praire Oil & Gas Co., 24-9-5, 46.66 barrels.

Barnsdall Oil Co., 14-8-5, 247 barrels. (This well came in on Dec. 9 flowing 100 barrels per hour. Owing to casing trouble it made 3717 barrels before it could be shut in. Since then it has been shut in entirely, except for 11 hours during the past week when it flowed 600 barrels, or less than its permitted 100 barrels per day.)

Snowden & McSweeney, 13-7-6, came in Dec. 6 and was produced to capacity for 5 days and then was shut in. Since then it has been opened once a week and allowed to flow enough to average 100 barrels per day.

With this record of voluntary restraint and the very marked sentiment that the good work should be kept up for several months longer, 1928 does look better from a Mid-Continent standpoint than did 1927 at the same time of the year. No area outside Seminole now has the appearance of developing a major pool.

COMING down to current events, Logan county took a severe setback during the week. Roxana Petroleum Corp.'s second Wilcox sand well northwest of Lovell is a failure. The first well, No. 1 McCully, in the SW

(*Continued on Page* 44)

Drilling Operations in Oklahoma, Kansas and Texas, Week Ended December 31, 1927

	December 31 Week Ended					December 24				
	Loc.	Rigs	Drg.	S.D.	Total	Loc.	Rigs	Drg.	S.D.	Total
OKLAHOMA										
Burbank	4	25	16	2	47	4	6	16	3	29
Other Osage	3	4	22	3	32	3	5	18	3	29
Bristow-Cushing	7	9	34	7	57	9	9	32	5	55
North Oklahoma	14	10	76	40	140	15	8	67	40	130
South Oklahoma	7	14	127	32	180	4	22	125	36	187
Muskogee		4	45	25	74		9	38	26	73
Okmulgee-Bristow	7	33	53	27	120	7	33	59	21	120
Tonkawa			No Report			1	1	5	1	8
Seminole Dist	19	36	188	17	260	16	27	202	16	161
Total Oklahoma	61	135	561	153	910	59	120	562	151	892
KANSAS	26	52	107	69	254	26	52	107	69	254
TEXAS										
Central		129	204	135	468		124	216	124	464
Panhandle		103	83	82	268		99	92	76	167
N. Central		38	88	27	153		40	86	31	157
West		111	211	149	471		145	206	146	497
Laredo		1	25	19	45		1	25	19	45
Total Texas		382	611	412	1.405		409	625	396	1,430
NEW MEXICO		3	15	29	47		2	19	25	46
GRAND TOTAL	87	572	1.294	663	2.716	85	583	1.313	641	2.622

Seminole District Production by Companies and Leases, December 30 and December 23, 1927

Company	Farm	S.T.R.	Dec. 30th Wells	Dec. 30th Prod.	Dec. 23rd. Wells	Dec. 23rd. Prod.
BOWLEGS						
Amerada	Rascoe	15- 8-6	8	3,115	8	3,465
Atlantic	Baker	1- 8-6	4	665	4	755
Atlantic	Fleet	23- 8-6	4	449	4	790
Atlantic	Grayson	12- 8-6	3	1,277	3	1,371
Atlantic	A. Jones	10- 8-6	3	112	3	127
Atlantic	C. Jones	9- 8-6	2	357	2	413
Total Atlantic			16	2,850	16	3,456
Barnsdall	McNac	28- 8-6	1	38	1	35
Barnsdall	Murrow	11- 8-6	4	482	4	1,104
Total Barnsdall			5	880	5	1,139
Carter	Bowlegs	15- 8-6	3	1,270	3	1,330
Carter	Burden	23- 8-6	3	460	3	505
Carter	Harjoche	15- 8-6	6	980	6	1,025
Carter	Hilly	23- 8-6	2	730	2	815
Carter	Jones	11- 8-6	3	2,650	3	2,895
Carter	Melisse	9- 8-6	1	1,070	1	1,220
Carter	Walker	15- 8-6	3	530	3	580
Carter	McGeisey		1	25	0	0
Carter	Wise	23- 8-6	12	6,390	12	7,080
Total Carter			34	14,105	34	15,450
Empire	Lacey	15- 8-6	6	740	6	835
Empire	Wise	23- 8-6	2	1,008	2	1,087
Total Empire			8	1,748	8	1,922
Gypsy	Bowlegs	22- 8-6	1	335	1	320
Gypsy	Bradley	9- 8-6	1	45	1	50
Gypsy	Brown	33- 8-6	1	50	1	50
Gypsy	Cumsey	8- 8-6	4	1,795	4	1,922
Gypsy	Dosar	7- 8-6	1	680	1	62
Gypsy	Grayson	13- 8-6	4	1,365	4	1,907
Gypsy	Harjoche		1	1,287	1	1,227
Gypsy	Jones	11- 8-6	1	545	1	0
Gypsy	Walker	15- 8-6	8	2,575	8	2,640
Gypsy	Wise	23- 8-6	3	67	3	37
Total Gypsy			26	8,744	26	8,215
I. T. I. O.	Barnett	24- 8-6	2	484	2	549
I. T. I. O.	Billington	22- 8-6	5	570	5	834
I. T. I. O.	Bowlega	22- 8-6	11	1,238	11	902
I. T. I. O.	Burden		1	2	1	16
I. T. I. O.	Davis	13- 8-6	4	2,217	4	2,012
I. T. I. O.	Fay	18- 8-6	8	4,820	7	3,131
I. T. I. O.	Goforth	15- 8-6	11	1,835	11	1,852
I. T. I. O.	Hull	26- 8-6	1	38	1	21
I. T. I. O.	Livingston	15- 8-6	11	4,798	11	4,688
I. T. I. O.	Lizzie	11- 8-6	2	716	2	807
I. T. I. O.	Walker	15- 8-6	8	1,345	8	1,453
I. T. I. O.	Wilmont	15- 8-6	4	1,258	4	1,619
I. T. I. O.	Youngblood	22- 8-6	2	301	2	0
Total I. T. I. O.			70	19,138	69	17,884
McCulloch	Bowlegs	22- 8-6	3	352	3	392
Magnolia	Davis-BF	13- 8-6	1	736	1	772
Magnolia	Davis-M	13- 8-6	1	521	1	578
Magnolia	Hammond	10- 8-6	2	150	2	0
Magnolia	Rhodes	10- 8-6	2	3,882	2	634
Magnolia	Van Buskirk	9- 8-6	1	64	1	428
Total Magnolia			7	5,353	7	2,412
Mid-Continent	Baker	10- 8-6	4	2,120	4	2,261
Mid-Continent	Bowlegs	22- 8-6	1	0	1	0
Mid-Continent	Smith	12- 8-6	5	930	4	880
Total Mid-Continent			11	3,051	10	3,149
Minnehoma	Bowlegs	15- 8-6	3	70	3	137
Prairie	Gahagan	23- 8-6	4	920	4	1,165
Prairie	Harber	10- 8-6	8	4,190	8	4,295
Prairie	Jones	11- 8-6	4	1,110	3	1,215
Prairie	Templeton	12- 8-6	4	3,865	4	4,440
Prairie	Whitney	23- 8-6	4	555	4	470
Total Prairie			24	10,640	23	11,585
Pure	Reed	14- 8-6	15	4,734	15	5,176
Pure	D-Strother	14- 8-6	4	868	4	1,049
Pure	E-Strother	14- 8-6	1	5	1	5
Pure	F-Strother	10- 8-6	2	952	2	1,032
Total Pure			22	6,559	22	7,263
Roxana	Taylor	16- 8-6	6	1,584	6	1,567
Shaffer	Lacey	14- 8-6	3	770	3	652
Sinclair	Bowlegs	22- 8-6	1	30	1	40
Sinclair	Cumsey	10- 8-6	2	4,389	2	4,470
Sinclair	Ellen	11- 8-6	6	2,668	6	2,687
Sinclair	Harjo	14- 8-6	3	1,120	3	1,195
Sinclair	Jones	8- 8-6	6	5,910	6	5,790
Sinclair	Taylor	10- 8-6	4	4,006	4	4,240
Sinclair	Walker	22- 8-6	4	1,015	4	1,060
Total Sinclair			26	19,138	26	19,482
Texas	Reed	14- 8-6	9	4,550	9	4,795
Tidal	Grayson	13- 8-6	3	770	4	1,400
Tidal	Harjoche	10- 8-6	6	2,250	6	2,375
Total Tidal			9	3,020	10	3,775
Twin State	Jones	10- 8-6	2	15	2	30
TOTAL BOWLEGS			295	106,166	291	106,535
LITTLE RIVER						
Amerada	Fore	35- 8-6	2	1,275	2	1,400
Amerada	Nitey	35- 8-6	4	2,735	4	2,755
Total Amerada			6	4,010	6	4,165
Barnsdall	Hotulke	22- 7-6	1	0	1	0
Blackwell	Nitey	35- 8-6	8	4,603	8	4,643
Carter	Fish	1- 7-6	4	1,715	4	1,875
Continental	Cosar	2- 7-6	2	610	2	600
Gypsy	Campbell	36- 8-6	2	37	2	317
Gypsy	Nungee	1- 8-6	1	75	1	80
Gypsy	Pottey	35- 8-6	2	595	2	695
Gypsy	Wadsworth	1- 7-6	1	22	1	37
Total Gypsy			6	729	6	1,129
Independent	Harris	23- 7-6	1	104	1	106
I. T. I. O.	Campbell	1- 7-6	1	190	1	206
I. T. I. O.	Dungan	35- 8-6	3	3,191	3	3,282
I. T. I. O.	House-MA	1- 7-6	1	468	1	569
I. T. I. O.	House-WE	1- 7-6	1	59	1	54
I. T. I. O.	House WE	2- 7-6	3	2,016	3	2,289
I. T. I. O.	Jackson	1- 7-6	3	2,643	3	2,836
I. T. I. O.	McCulla	1- 7-6	3	1,157	3	1,164
I. T. I. O.	Nitey	2- 7-6	6	1,692	6	1,909
I. T. I. O.	Phoebe-A	36- 8-6	3	776	2	757
I. T. I. O.	Phoebe-B	36- 8-6	3	865	3	1,016
I. T. I. O.	Reed	1- 7-6	1	181	1	165
I. T. I. O.	Sotkneche	1- 7-6	4	1,172	4	1,028
Total I. T. I. O.			32	11,707	31	15,275
Magnolia	Cruse		1	812	1	910
Mid-Continent	Wadsworth	26- 8-6	7	1,395	7	1,625
Mid-Continent	Smith	12- 8-6	1	40	1	40
Total Mid-Continent			8	1,435	8	1,665
Philmack	Davis	1- 7-6	1	1,580	1	1,775
Pine et al	Pottey		1	875	1	400
P & R	Dungan		2	180	2	145
P & R	House	2- 7-6	4	2,310	4	2,450
Total P & R			6	2,490	6	2,595
Roxana	Smith	1- 7-6	1	20	1	0
Sinclair	Cosar	36- 8-6	1	1,475	1	300
Snowden-McSweeney	Tiger	13- 7-6	1	0	1	0
Superior	Wadsworth	1- 7-6	1	21	1	21
Texas	Coker	1- 7-6	3	725	3	750
Tidal	House	1- 7-6	3	1,707	3	1,855
Tidal	Johnson	1- 7-6	1	72	1	90
Total Tidal			4	1,779	4	1,945
TOTAL LITTLE RIVER			89	37,610	87	38,154
EARLSBORO						
Amerada	Anderson	15- 8-6	3	2,135	3	1,825
Amerada	Cowden	4- 9-5	8	2,260	8	2,585
Amerada	Rodgers	3- 9-5	3	2,725	3	3,080
Total Amerada			14	7,120	14	6,490
Barnsdall	Brown	10- 9-5	4	2,885	4	2,668
Barnsdall	Bruner-F	2- 9-5	2	734	2	812
Barnsdall	Bruner-N	11- 9-5	4	2,230	4	2,145
Barnsdall	Cudjo	11- 9-5	1	27	1	28
Barnsdall	Davis-D	11- 9-5	3	2,021	3	2,251
Barnsdall	Davis-J	11- 9-5	4	576	4	940
Barnsdall	Davis-M	11- 9-5	3	2,525	3	2,670
Barnsdall	Gibson	9- 9-5	7	3,254	7	2,515
Barnsdall	Hearn	15- 9-6	1	9	1	7
Barnsdall	Ingram	4- 9-5	7	4,656	7	5,262
Barnsdall	Pack	10- 9-5	4	186	4	175
Barnsdall	Peter	10- 9-5	4	355	4	268
Barnsdall	Sango	2- 9-5	3	3,062	3	3,511
Barnsdall	Sebolka	15- 9-6	1	958	1	1,012
Barnsdall	Sullivan-H	11- 9-5	2	178	2	0
Barnsdall	Sullivan	10- 9-5	3	72	3	71
Barnsdall	Watsutke	12- 9-5	4	1,167	4	1,264
Total Barnsdall			57	24,895	57	25,599
Carter	Davis	13- 9-5	1	940	1	990
Carter	Payne	12- 9-5	3	855	3	920
Carter	Sango	2- 9-5	3	6,270	3	6,780
Total Carter			7	8,065	7	8,690
Continental	Kays	2- 9-5	2	290	2	645
Continental	Spencer	12- 9-5	4	2,460	4	2,040
Total Continental			6	2,850	6	2,685
Crosbie	Bryant	9- 9-5	2	345	2	455
Empire	Barker	12- 9-5	1	2,940	1	3,477
Empire	Edmundson	3- 9-5	3	1,487	3	1,690
Total Empire			4	4,427	4	5,167
Gypsy	Bruner	10- 8-6	4	3,285	4	3,300
Gypsy	Carter	11- 8-6	11	5,110	11	5,682
Gypsy	Hunick	5- 9-5	1	2,385	1	1,375
Gypsy	Noble	12- 9-5	4	4,932	4	4,357
Gypsy	Peter	10- 9-5	6	90	6	170
Gypsy	State	16- 9-6	4	1,557	4	1,500
Gypsy	Sango	1- 9-5	4	7,330	4	8,122
Gypsy	McFarland	9- 9-5	1	2	1	0
Gypsy	Earl	16- 9-5	1	15	1	57
Total Gypsy			36	24,706	36	24,563
Independent	Bruner	10- 9-5	4	240	4	475
Independent	Gaines	11- 9-5	2	1,730	2	2,695
Independent	Knapp	8- 9-5	5	3,736	5	3,374
Independent	O'Dell	4- 9-5	4	25	4	80
Independent	Sullivan	10- 9-5	4	73	4	25
Total Independent			19	5,804	19	6,649
Interocean	Payne	12- 9-5	1	0	1	0
Magnolia	Bryant	9- 9-5	6	2,149	6	2,175
Magnolia	Cowden	4- 9-5	4	31	4	64
Magnolia	Dixon		1	0	1	0
Magnolia	Edmundson	3- 9-5	3	64	3	32
Magnolia	Holmsley	11- 9-5	8	2,201	8	2,947
Magnolia	Ingram	10- 9-5	1	35	1	30
Magnolia	Lena	10- 9-5	3	91	3	90
Magnolia	Seay	12- 9-5	8	4,515	8	2,865
Magnolia	Simpson	10- 9-5	4	344	4	384
Magnolia	Sparks	11- 9-5	7	3,053	7	3,072
Magnolia	Sullivan	12- 9-5	3	679	3	873
Total Magnolia			48	13,162	48	12,532

(Continued on Page 43)

Seminole District Production by Companies and Leases, December 30 and December 23, 1927

(Continued from Page 42)

Company	Farm	S.T.R.	Dec. 30th Wells	Dec. 30th Prod.	Dec. 23rd. Wells	Dec. 23rd. Prod.
Mid-Continent	McCumber	9- 9-5	7	1,470	7	1,525
Mid-Kansas	Anderson	14- 9-5	4	410	4	445
Phillips	Dunnaway	15- 9-5	1	30	1	30
Phillips	Graham	9- 9-5	7	181	7	200
Total Phillips			8	211	8	230
Prairie	Baker	23- 9-5	1	50	1	50
Prairie	Davis	13- 9-5	4	1,285	4	1,260
Prairie	Graham-C	3- 9-5	2	10	2	60
Prairie	Graham-O	10- 9-5	4	2,480	4	2,700
Prairie	Stidham	11- 9-5	13	6,135	13	7,195
Total Prairie			24	9,960	24	11,275
Roxana	Bayliss	17- 9-5	1	19	1	0
Roxana	Spencer	12- 9-5	2	1,264	2	1,820
Total Roxana			3	1,283	3	1,820
Shaffer	Clark	1- 9-5	5	1,848	5	1,355
Sinclair	Foreman	18- 9-5	1	15	1	15
Sinclair	Hollins	12- 9-5	3	640	3	155
Sinclair	Sango	2- 9-5	1	5,965	1	5,770
Total Sinclair			5	6,620	5	5,940
Skelly	Spencer	12- 9-5	2	1,755	2	1,696
Texas	Anderson	2- 9-5	6	1,252	6	1,320
Texas	Brown	10- 9-5	8	2,650	8	2,045
Texas	Rodgers	5- 9-5	3	6,055	3	6,095
Texas	Wilmont	10- 9-5	6	3,450	6	3,155
Total Texas			23	13,407	23	12,615
Tidal	Watkins	9- 9-5	6	2,690	6	2,555
Twin State	Barker	12- 9-5	4	255	4	270
Twin State	Hearn	2- 9-5	3	4,955	3	7,445
Total Twin State			7	5,210	7	7,715
TOTAL EARLSBORO			288	136,238	286	140,991
TOTAL LITTLE RIVER			89	37,610	87	38,154
TOTAL SEARIGHT			68	20,922	68	20,423
Barnsdall Fife			1	600		
TOTAL BOWLEGS			296	106,166	291	106,535
TOTAL SEMINOLE			319	56,955	319	56,484
GRAND TOTAL SEMINOLE AREA			1,060	357,891	1,052	362,587
Average per well					337	344

Completions in N.E. Central, West, Panhandle and North Texas, Week Ended December 31, 1927

NORTH AND EAST CENTRAL TEXAS

Brown County

Company	Well Farm	Location Survey	Depth	Init. Prod.
Cranfill et al	19-Smith	SA&MG	1347-1357	20
Phillips	9-Newsome	Presslar	1312-1328	150
Pandem	1-Hutton	Nobles	1119-1131	48

Callahan County

Empire	1-Snider	BBB&C	926-929	45
Forest	1-McDermott	Comal	T.D. 1710	Dry
National	1-Moore	S&P	T.D. 2115	Dry

Coleman County

Peer	1-Smith	GH&H	T.D. 2507	Dry
Magnolia	19-Morris	Breeding	2270-2275	55

Comanche County

Moore	1-Strickland	Stephenson	2650-2825	3½M
Hoffer	1-Roscoe	Elliott	T.D. 3182	Dry

Eastland County

Magnolia	1-Pettit	Finch	T.D. 1833	Dry
Eastland	5-Wright	McLennan	T.D. 3580	Dry
Teatsorth	1-Martin	Lyman	1430-1441	1M

Jack County

Buttram	6-Jones	SP	1967-1976	10

Shackleford County

Big States	1-Webb	TP	972-976	20
Big States	2-Webb	TP	970-976	15

Young County

Atkinson et al	2-Donnell	TE&L	T.D. 2295	Dry

NORTH TEXAS

Archer County

Burton et al	3-Farmer	N A R	1505-1506	48
Consolidated et al	4-Turbeville	Carson	T.D. 1558	Dry
Gray County	1-Estil	Jose	T.D. 1604	Dry
Atlantic et al	1-Neale	Waicischouski	T.D. 1253	Dry

Montague County

Archer Drlg	1-Fortine	Nichols	T.D. 1800	Dry

Wichita County

Rollstone et al	1-Schnokenbery	Housman	T.D. 3590	Dry
Texas	338-Waggoner	Cook	T.D. 2177	Dry
Texas	337-Waggoner	H&TC	1950-1952	47
Hammon	2-Mitchell	Castleman	842-857	12
Hammon	1-McCarty	Eaves	239-243	10
Vergate	1-Deep	KWVFL	1777-1781	75

Wilbarger County

Phillips	22-Waggoner	H&TC	1894-1907	35

Young County

Company	Well Farm	Location Survey	Depth	Init. Prod.
Christie et al	2-Carter	TE&L	T.D. 1212	Dry
Clark et al	2-Howell	TE&L	T.D. 883	Dry

PANHANDLE

Gray County

Empire	1-George	I&GN	3080-3210	120&15M

WEST TEXAS

Crane County

Magnolia	13-Harwick	Univ.	2954-2973	200
Tidal	3-Univ.	Univ.	2810-2889	250

Crockett County

Gulf	3-Thompson	I&GN	1042-1042	960

Howard County

Magnolia	8-Chalk	W&NW	1633-1654	30

Lamb County

Talbot et al	1-Ellwood	Thompson	T.D. 1504	Dry

Pecos County

California	4-Smith	GC&SF	1574-1650	1344
Humble	5-Smith	GC&SF	1290-1475	282
California	3-Yates	GC&SF	1275-1311	235
Mid-Kansas et al	6-Smith	GC&SF	1178-1229	2160
Marland	9-Yates	I&GN	970-1017	885
Mid-Kansas et al	8-Yates	I&GN	1080-1112	3796
Mid-Kansas et al	7-Yates	I&GN	1132-1268	265
Mid-Kansas et al	8-Yates	I&GN	998-1063	2108
Mid-Kansas et al	13-Yates	I&GN	976-1040	155
Mid-Kansas et al	14-Yates	I&GN	1015-1042	940
Mid-Kansas et al	15-Yates	I&GN	965-1044	1174
Mid-Kansas	16-Yates	I&GN	1010-1050	1004

Stonewall County

Peer et al	1-Morrows	H&TC	T.D. 3035	Dry

Upton County

Texas Pacific	11-Lane	MK&T	2053-2057	104
Skelly	1-Lane	GC&SF	2045-2080	60

Winkler County

Independent	1-Howe	PSL	2846-3043	415
Republic Prod	1-Hendricks	PSL	2798-2870	6010
Atlantic	1-Hendricks	PSL	2637-3012	3054
Humble	4-Hendricks	PSL	2865-2890	2402
Humble	1-Hendricks	PSL	2936-2968	2396
Independent	1-Hendricks	PSL	2824-2879	7509
Independent	2-Hendricks	PSL	T.D. 2815	478
Landreth Prod	4-Hendricks	PSL	2930-2988	3992
Magnolia	1-Hendricks	PSL	2713-2935	3350
Roxana	1-Hendricks	PSL	2695-2885	6990
Humble	3-Hendricks	PSL	2990-3025	2369

Many Autos to Have Larger Engines

NEW YORK, Dec. 31.—*Automotive Industries* this week said:

A large proportion of the motor car factories are now in production on new models to be announced in connection with the New York automobile show. The number of completely new cars to be exhibited exceeds all recent records, an evidence of the stress of competitive conditions. Whereas in former years minor changes have predominated, the manufacturers are now in many instances rebuilding almost the entire car.

Although the innovations to be introduced are still largely confidential, it is known that in the low-priced field there is a distinct trend to longer wheelbases, more power and the virtually universal adoption of four-wheel brakes. Less drastic changes are observed among higher-priced cars, but the effort to attain greater engine power is also in evidence in this field. Increased efficiency is being relied upon for much of the increase, but in many cases there are larger dimensions of bore and stroke.

Some notably quick changeovers to new models have been made at the factories. Production was necessarily interrupted, but not for long periods, and the low point in production reached in recent weeks was mainly for the purpose of permitting dealers to liquidate stocks.

Rumors of price cut are too general and persistent to be ignored, but there is as yet no evidence that a downward trend will be followed throughout the field.

Completions in Oklahoma and Kansas, Week Ended D[illegible]ber 31, 1927

OKLAHOMA

Carter County

Company	Farm No.	Location	Depth		Init. Prod.
Magnolia	2	SEc SW NW 29-1-3 W	2803-2817		31
Magnolia	1	SEc NE SW 33-1-3 W	3676-3686		284
Roxana	1	SWc NE 2-5-3 W	T.D. 3445		Dry

Cotton County

Howe et al	2	SWc NW SE SW 27-1-10 W	2164-2185		30

Creek County

Twin State	1	NWc NE NW 15-15-8 E	3204-3214		9¼M
Stover et al	2	C SW NE 10-17-10 E	2561-2570		100
Independent	4	NEc SW NE 18-14-10 E	3421-3444		650
Murta-Cole	1	NEc SW 35-16-10 E	T.D. 3034		Dry

Grady County

Okla. Gas Utilities	7	NWc SW 26-5-8 W	2019-2400		35M
Noble et al	4	NWc NE NW 35-5-8 W	2040-2400		26M
Carter	1	SWc SE NW 8-3-5 W	2773-2792	OWD	107
Harmon et al	4	NWc SW NW 16-3-5 W	2296-2306		170

Kay County

Harold	6	CEL W½ SE SW 4-27-1 W	3416-3424	OWD	200
Barnsdall et al	1	NWc 2-25-2 W	T.D. 1156		1½M
Greer et al	1	C SE NE 30-28-1 E	T.D. 1090		Dry

Mayes County

Arrowood et al	2	CWL SW SW 7-19-17 E	460-466		1.25M

Muskogee County

Crittenden	1	NEc NW NE 6-14-19 E	T.D. 655		Dry

Okfuskee County

Texas	2	SEc NE SE 35-11-11 E	2468-2930	OWD	3M

Okmulgee County

N.T.C.	1	SEc SW 25-16-13 E	1623-1630		10M
Campbell et al	1	NWc NE SW 2-15-12 E	2022-2547		5M
Sheedy et al	1	SWc SE 9-15-14 E	1902-1923		1M
McCulloch	2	NEc NW SE 29-16-13 E	T.D. 1790		Dry

Osage County

Parker	1	CSL NE 22-25-7 E	T.D. 2680		Dry
Phillips	5	NEc SW 17-27-6 E	2898-2960		220
Kewanee	6	SEc NE SW 34-27-6 E	2764-2817		150

Pawnee County

Watchorn	4	SWc 33-23-3 E	T.D. 4505	OWD	Dry

Pontotoc County

T.P.C.&O.	1	NEc NW SW 27-5-6 E	T.D. 2980		Dry
Ramsey	1	NEc NW 29-5-8 E	T.D. 2844		Dry
Louisiana	3	NWc SW SE 17-5-8 E	2452-2515		150
Ramsey	2	NEc SW 17-5-8 E	2295-2304		30M
Ramsey	4	SEc 18-5-8 E	2280-2350		22M
Ramsey	1	NEc NE 30-5-8 E	2460-2639		275
American O & R.	1	C E½ SE 8-4-6 E	1315-1324		6M

Pottawatomie County

Superior	1	SWc NW NW 24-7-4 E	3742-3775		17M
Tidal	4	NWc NE NW 9-9-5 E	4296-4303		50
Magnolia	4	SWc NE SW 4-9-5 E	T.D. 4690		Dry

Rogers County

Low Riggs	1	SWc SE NW 1-21-16 E	742-765		40

Company	Farm No.	E -5 E	Depth		Init. Prod.
Gypsy	1	S[illegible]	3730-3734		50
Barnsdall	2	NE[illegible]	4704-4708		3129
Carter	3	SE[illegible]	4320-4334		715
Texas	6	NEc S[illegible]	4517-4519		200
Magnolia	7	NWc SW SW [illegible] 5 E	4336-4344		25
Pine	1	NEc SW 4-9-6 E	4388-4470		50
Superior	1	NEc SW NW 4-9-6 E	4480-4500		107
Gypsy	4	SEc NE NE 35-9-6 E	4218-4277		250
Pure	7	SEc SW 11-8-6 E	4475-4485		281
Magnolia	1	SEc NE SW 12-8-6 E	4158-4188		678
Carter	2	NWc SW SE 15-8-6 E	4057-4160		135
Amerada	3	NEc NW NE 35-8-6 E	4263-4274		850
Producers & Refg.	3	NEc NW SE 35-8-6 E	4454-4458		600
Magnolia	1	NWc SE SE 2-7-6 E	4207-4215		767

Stephens County

Page et al	2	C SWc NW SE 12-2-8 W	T.D. 2508		Dry
Gilmer	1	SWc SE SE 24-1-4 W	T.D. 3075		Dry

Tulsa County

Holmes et al	1	CWL SW SE 14-19-10 E	T.D. 2317		Dry
Posey Short	2	NWc NE SE 23-19-12 E	1142-1536		¼M

Wagoner County

Baldridge et al	1	C SW NW 22-18-17 E	780-785		5M
Ray	3	NEc NW SW SE 4-17-16 E	714-730		35

KANSAS

Butler County

Keen et al	1	SEc SW SE 5-27-6 E	T.D. 3149		Dry

Coffey County

Sheedy et al	3	SWc SE SW 1-23-13 E	1824-1850		20

Cowley County

Ark. Fuel	4	NEc NW 7-32-5 E	T.D. 3538		Dry

Elk County

Ohio Fuel	1	C NW NW 20-29-10 E	T.D. 1275		Dry
Jacqueline	2	NEc NW SE 34-29-12 E	831-854		32
Watchorn	10	SWc NW 3-30-9 E	2277-2304		37
Pennock	1	SEc NE SW 30-30-11 E	1519-1528	OWD	50
Landen et al	1	NEc 22-31-10 E	1636-1643		20

Greenwood County

Empire	4	SWc NE NE 22-22-11 E	1687-1916		60
Empire	1	NWc NE NE 26-22-12 E	1661-1724		135
Empire	1	NWc NE 15-25-13 E	1427-1435		25
Rogers et al	1	SEc NW NW NW 2-26-10 E	1960-1985		25
McGinnis et al	1	NEc SW SW 4-27-11 E	1823-1838		100
Empire	3	SEc NE NE 25-22-12 E	1634-1687		42
Manson	1	NEc NW NW 30-22-13 E	T.D. 1790		Dry

Marion County

Harwood et al	1	SEc SW 2-17-4 E	T.D. 2390		Dry

Sumner County

Phillips	1	SEc NW 24-32-2 E	T.D. 3204		Dry
Roxana	4	Tract 5, 14-32-2 E	1994-2105		3230
Roxana	7	Lot 7, Blk 38, 14-32-2 E	2054-2114		75

(*Continued from Page* 41)

NE SE of 30-19-4W, has been and is still a wonder well. It has produced more than 400,000 barrels of oil since it hit the big pay late in June. The second well to reach the Wilcox is the No. 1 Stephens, in the SW of 29-19-4W, about a quarter of a mile southeast of the discovery.

The discovery had top of the Wilcox at 5985 feet. The Stephens got it at 6102 feet, went to total depth of 6110 feet and was rewarded with 3600 feet of water in the hole. It is now being plugged back to the place where it got oil and gas above the Wilcox, this being around 5950 feet, and that oil, amounting possibly to 150 barrels per day, will be produced.

As a result of this failure, Roxana suspended plans for drilling No. 2 McCully, in the SE SE of Sec. 30, a west offset to the Stephens. Rig is up and will be left there pending the outcome of the L. H. Wentz test, northeast corner of Sec. 31, a diagonal offset southwest to the failure. This well is below 5500 feet in depth now. Roxana has one more in this group which is soon to be completed. It is No. 1 Williams, in the NW of Sec. 32. It has just set the 6¼-inch at 5935 feet. It is a direct south offset to the failure.

Naturally, this failure puts a damper on the north-south trend theory. There are a number of quite costly wells going down on leases soon to expire and these will supply some information as to structure.

In Lincoln county, Okla., the Shaffer Oil & Refining Co., a persistent seeker for production in the little Wilcox "hickeys" which abound in that part of the state, got some reward for their efforts seven miles southwest of the town of Cushing. The No. 2 Skinner, in the SW SE of 31-17N-5E, made 752 barrels from the Wilcox at 4234-40 feet, although the oil was about 2½ per cent cut. A half mile east there is a Wilcox failure and about a half mile northwest is another.

The Kansas wildcats were tame during the week. A little encouragement to the idea that northern Marion county should produce oil was had by Loriaux & Irwin, drilling near Lost Springs. Their No. 1 Weston, SW NW NW of 23-17S-4E, found top of a "chat" formation at 2355 and 10 feet farther in had a show of oil. From 2385-90 was a sand which yielded water. An oil pay was picked up at 2409-20 and it swabbed 100 barrels. The oil is 37 gravity.

Michigan Tax Upheld

CHICAGO, Dec. 31.—The 3-cent gasoline tax which has been contested in the courts of Michigan has been upheld by the Supreme Court of the state. If the decision had been otherwise and the 3-cent tax law invalidated the Michigan jobbers would have found themselves operating under the 2-cent tax law in force when the contested law took effect. The 3-cent law carries an allowance of 3 per cent for shrinkage which the oil men favor rather than the old law which embodied no such provision. The old tax was paid on sales of gasoline. The new tax is levied on receipts of gasoline.

WASHINGTON, Dec. 31.—"Identification of Oil Field Waters by Chemical Analysis" by C. E. Reistle, Jr. is a new publication announced by the Bureau of Mines. Free copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. Copies for distribution may be purchased at 5 cents each.

New Field Operations in Oklahoma, Kansas, Panhandle, North, North Central and West Texas, Week Ended December 31, 1927

OKLAHOMA

Carter County

Company	Well No. Farm		Remarks
Magnolia	1-Cudd	SW 23-1-3 W	
Magnolia	3-Ratliff	SW SW 29-1-3 W	
Magnolia	2-Hefner	NE SW 33-1-3 W	
Magnolia	2-Choens	NEc SE SW 33-1-3 W	
Magnolia	2-Johnson	SWc NW 33-1-3 W	

Creek County

Tibbens	3-Fobes	SWc SE SW 20-15-9 E	
Henry et al	2-Harris	SEc SW SE 12-17-10 E	
Kennedy et al	2-Strip	SEc SW SW 24-18-11 E	OWD
Roxana	4-Sewell	NEc NW NE 18-19-9 E	
Gibson et al	3-Tiger	NWc SW 17-17-7 E	
Shaffer	4-Tiger	SWc NW 17-17-7 E	
Gray	1-Beaver	NWc SE SW 20-15-8 E	
Magnolia	1-Ringer	NEc 15-1-3 W	

Grady County

Franklin	1-Burkes	SEc NE SE 17-3-5 W	
Hall	1-Woods	SWc 1-4-8 W	

Hughes County

Whitney	1-Huddlestone	SEc SW 17-5-9 E	

Kay County

Comar	1-Jennings	NWc SE 19027-1 W	
Boucher et al	1-Cooper	SEc 23-27-2 W	
Ingram et al	1-Benson	C SW SW 32-28-1 E	
Dewey et al	2-School land	SWc SE NW 36-28-1 W	
Four Leaf	1-Parker	SWc NE SW 28-29-1 E	

Muskogee County

Holt et al	1-Cherry	NEc SW NW 2-14-18 E	
Foltz	1-Woodall	SEc SW NW 20-15-16 E	

Okmulgee County

Powell	1-Deer	NEc SE NE 20-14-15 E	
Aggas et al	2-Smith	NWc NE NW NE 20-12-14 E	
Rebold	1-Brooks	SWc NE 6-15-13 E	
Noble	2-Fisher	NEc SW 6-15-13 E	
Devonian	1-Jones	SEc NW 6-15-13 E	
Jolly Ogg	1-Crawford	SWc NW SW 12-13-11 E	
Young et al	1-Snoddy	SEc SW SW 21-14-11 E	

Osage County

McDonnell		SEc SW 6-21-9 E	
Devonian	1	NWc SE 18-22-8 E	
Carter	6	SEc NE SE 3-26-6 E	
Carter	5	NEc SE SE 3-26-6 E	
Carter	4	SEc 3-26-6 E	
Carter	3	NEc NW SE 3-26-6 E	
Carter	2	NWc NE SE 3-26-6 E	
Carter	1	NEc SE 3-26-6 E	
Phillips	2	NWc SW NW 2-26-6 E	
Phillips	1	SWc NW 2-26-6 E	
Wah-Sha-She	1	C N L S½ NE 6-27-12 E	
Osage	384	SEc NW 5-27-11 E	
Kewanee	1	SEc NE 28-27-6 E	
Kewanee	2	SWc SE NE 28-27-6 E	
Kewanee	3	SEc SW NE 28-27-6 E	
Kewanee	4	NWc SE NE 28-27-6 E	
Kenanee	5	NEc SW NE 28-27-6 E	
Kewanee	6	NWc NE 28-27-6 E	
Gypsy	8	NWc SE 28-27-6 E	
Phillips	6	NWc NE SW 17-27-6 E	

Pontotoc County

American	7-Balcrop	SWc NW SW 9-4-6 E	

Potawatomie County

Magnolia	1-Hardin	SWc NW 12-7-4 E	
McCullough	1-Long	SEc SW SW 18-7-4 E	
Continental	2-Neghnguit	SWc SE NW	

Seminole County

Ramsey	1-Hulwa	SEc NE 7-5-8 E	
Ramsey	1-Culley	NEc SE NE	
Louisiana	2-Reed	SEc NE NE 18-5-8 E	
Gardner et al	1-Harris	NWc SE 36-6-7 E	
Texas	1-Reed	SWc 12-8-5 E	
Blackwell	1-Porter	SEc SW 3-9-8 E	
Sinclair	2-Cosar	SEc NW NW 36-8-6 E	
Continental	4-Cosar	SWc NE NW 36-8-6 E	
Continental	3-Cosar	NWc SE NW 36-8-6 E	
Carter	8-Fish	NEc SW NW 36-8-6 E	
Gypsy	2-Harhoche	SWc NW 10-8-6 E	
Carter	1-Micco	SEc NE 9-8-6 E	
Sinclair	3-Sango	NEc SE NE 2-9-5 E	

Stephens County

Magnolia	1-McCulley	NWc NE 28-1-5 W	
Pace et al	2-Fobb	C SWc NW NE 12-2-8 W	
Cruce	1-Frensley	SWc NW NE 12-1-6 W	

Tulsa County

Jackson et al	3-Sango	NWc SW NE 21-19-12 E	
Minshall et al	5-Fife	SEc SW 15-19-11 E	

KANSAS

Butler County

Rosenthal et al	9-Shaffer	SWc SE SE 4-27-6 E	
Allison et al	4-McGinnis	NWc NE NE 9-27-6 E	

Cowley County

Shawver et al	1-Amann	NWc 10-34-3 E	

Elk County

Jacqueline	1-Weirman	SEc SW NE 34-29-12 E	
Pennock	1-Collyer	SEc NE SW 30-30-11 E	OWD
Pennock	1-Pickle	CNL SE SW 30-30-11 E	OWD
Union	1-Vick	C NE SW 2-31-10 E	
Union	22-Webb	C NW NE 14-31-10 E	
Jones et al	6-Webb	NWc SW 23-31-10 E	

Greenwood County

Empire	7-Delmar	SWc NW NE 25-22-12 E	
Empire	8-Delmar	SEc NW NE 25-22-12 E	
Empire	5-Ott	SEc NE NW 25-22-12 E	
Empire	6-Ott	SEc NE NW 25-22-12 E	
Empire	5-Schwab	SEc NW SE 25-22-12 E	
Empire	7-Schwab	SWc NW NE 25-22-12 E	
Empire	8-Schwab	SEc NW NE 25-22-12 E	
Eureka	1-Brothers	SEc NW 35-23-11 E	
Empire	1-Haggart	NWc SW NW 9-25-13 E	

Books County

Krugar et al	1-Poor	NEc 14-8-16 W	

Russell County

Phillips	1-Bungarth	SWc NW SE 31-12-15 W	

Sumner County

Company	Well No. Farm	Location	Remarks
Champlin	3-Love	NWc SW 9-30-2 E	
Roxana	1-Strout	SEc NE 24-31-2 E	
Roxana	4-Taton	NEc SW NE NW 36-31-2 E	
Derby	3-Burkett	Blk. 88, 14-32-2 E	
Roxana	1-Bussard	NWc Tract 2, 14-32-2 E	
Roxana	1-Emerich	NEc Tract 5, 14-32-2 E	
Wasson et al	3-Gassoway	CNL SE SW 12-32-2 E	
Palmer et al	1-Wenrich	NEc NW 23-32-2 E	

TEXAS

Panhandle and West Texas

Glasscock County

Magnolia	1-Roberts	NEc NW SE Sec. 156, Blk. 29,	W&NW

Gray County

Small-Wood et al	1-Taylor	C NE Sec. 10, Blk 2,	H&GN
Texas	1-Davis	SEc NE Sec.-8, Blk 1	ACH&B
Texas	1-Williams	CNL NW Sec.-7, Blk 1	ACH&B
Texas	1-Thut	SEc NW Sec.-1, Blk 1	H&GN

Howard County

Magnolia	6-Roberts	NEc SW Sec-136, Blk-29	W&NW
Merrick et al	1-Roberts	SWc Sec-137, Blk-29	W&NW
Owen et al	3-Roberts	NWc SE Sec-136, Blk-29	W&NW
Owen et al	4-Roberts	SEc Sec-136, Blk 29	W&NW

Hutchinson County

Phillips	1-Cockrell	SWc Sec-2, Blk-Y	M&C

Lamb County

Spade	1-Andrews	SE NE NE Labor 23, League 643, Capital school land survey	

Loving County

Deleware	1-Lockhart	C-Sec-79, Blk-1	W&NW

Pecos County

Roxana	4-Smith	Sec-27, Blk-194	TC
California	8-Smith	Sec-35, Blk-194	TC
California	9-Smith	Sec-35, Blk-194	TC
California	10-Yates	Sec-34, Blk-194	TC
Gulf Prod.	7-Smith	Sec-28, Blk-194	TC
Gulf Prod.	6-Smith	Sec-28, Blk-194	TC
Allsman et al	8-River Bed		

Reeves County

Vacuum	1-Grisham	CEL Sec-46, Blk-55	PSL

Val Verde County

Thraves	1-Wilson	Sec-115, Blk-E	GC&SF

Wheeler County

Watchorn	2-Sheldon	C SW SW Sec-19, Blk-24	H&GN
Mid-Kansas	1	SWc NW Sec-92, Blk-17	H&GN
Mid-Kansas	1-Coates	NWc SE Sec-93, Blk-17	H&GN

Winkler County

Gulf Prod.	9-Hendricks	NW SW NW Sec-34, Blk-B-5	PSL
Texas	1-Hendricks	NWc SE Sec-45, Blk-26	PSL
Roxana	2-Hendricks	NW SW SE Sec-41, Blk-B-5	PSL

NORTH CENTRAL TEXAS

Archer County

Madden et al	1-Hausler	Sec-2,	Poitevant
Rose et al	1-Harrison	Sec-1576,	TE&L
Panhandle	1-Garvey	Sec-1856,	TE&L
Texas	1-Garvey	Sec-93,	JCSL
Panhandle et al	1-Porter	Sec-25,	Abble
Texas	1-Seay	Sec-110,	Harris
Rayzor et al	1-Emothru	Sec-102,	Harris
Hines et al	1-Wilson	Sec-3,	Taylor
Grebin et al	1-Waggoner	Sec-3, Blk-4,	H&TC

Brown County

Inland	1-Cleveland	Sec-19,	Kraber
Smith-	1-Hines	Blk-647,	Eldridge
Stanley	1-Lewis	Blk-624,	Kenney
Metts et al	1-Childers	Sec-10,	H&TB
Gilmand et al	1-Hickman	Sec-783,	Benson
Senior Pet.	1-Baker	Sec-10, Blk-161,	White
Cranfill et al	1-De Busk	Blk-646,	Padillo
Daniels et al	1-Alcorn	Blk-623,	Honeycutt
Nat. Gas & Fuel	1-Capps	Blk-17,	Sullivan
Curtis	1-Fuller		Neil

Callahan County

Young et al	1-Wheeler	Sec-119	BBB&CRR

Coleman County

Kemson	1-Powell	Blk-192,	Greer
Dallas	1-Babington	Blk-79,	Rose
Mid West Explora	1-Overall	Blk-66,	Overall
Slaughter et al	1-Idol	Blk-266,	Starkweather

Cooke County

Lawson et al	1-McFadden	Sec.-69,	Bond

Grayson County

Burnam et al	1-Texas	Nussey Co.	Strickland

Jack County

Petroleum Ford	1-Fields	Sec-41,	Balch

Montague County

Continental	1-Jones	Sec-3,	Donohoo
Crenshaw	1-Shackley	Sec-698,	AS&MG
Seigler et al	1-Hinton		Coats

Palo Pinto County

Short et al	1-Marlow	Sec-19, Blk-A,	T&P

Runnells County

Sellis et al	1-Malone	Sec-38, Blk-532,	Diaz
Jones		Sec-29, Blk-29,	ETRR

Shackleford County

Thomas	1-Herron	Sec-10, Blk-11,	T&P
Roeser et al	1-Cook	Sec-61,	ETRR
Roeser et al	1-Cook	Sec-62,	ETRR

Wilbarger County

Murchison	1-Waggoner	Sec-3,	SPR
Barkley et al	1-Waggoner	Sec-24, Blk-4,	H&TC
Consolidated et al	1-Anderson	Sec-81, Blk-14,	H&TC
Phillips	1-Waggoner	Sec-43, Blk-4,	H&TC

Wichita County

Lomax et al	1-Etheridge	Blk-6, Palo Pinto	SL

Young County

Roberts et al	1-Stewart	Sec-76,	Dawson
Hines et al	1-Gregg	Sec-1586	Cantwell
Reed et al	1-Langston	Sec-1490	TE&L
Wolfe	1-Lowe	Sec-59,	TE&L
Mann et al	1-Martin		Hill

Water Shows Up In West Side of Hendricks Field

By Paul Wagner
N. P. N. STAFF WRITER

HOUSTON, Dec. 30

TWO groups of wells a mile and a half apart on the west side of the Hendricks field, Winkler county, are making large quantities of water with the oil and may limit the productivity of an important part of this west Texas territory.

The affected wells are believed, however, to be on low contours on the steep dipping side of the field. If this is true, then the encroachment of water may not immediately have any great effect on the main area of production to the north and northeast.

Most serious encroachment to date has been in the center of sec. 29, public school block B-5, where offsetting wells of the Magnolia, Atlantic and Humble companies are affected.

The Magnolia well, No. 2 Hendricks, which topped the lime horizon at 290 feet above sea level, was last reported producing 1450 barrels daily, 50 per cent water, at 2955 feet, or 441 feet in the lime. It originally made 180 barrels in 13 hours at 2875 feet, showing no water. At 2900 feet, it produced 520 barrels daily of clean oil.

Atlantic Oil Producing Co.'s D-1 Hendricks of the same group is now producing 2830 barrels daily, 2 per cent water; and the Humble's B-1 has been shut in after making up to 15 per cent water out of a total of 3,000 barrels of fluid. The Humble well, which found the top of the lime 160 feet below sea level, was drilled in 410 feet.

A well of the Roxana-Landreth partnership, belonging to the same sec. 29 group, is unaffected as yet. It came in recently for 4000 barrels daily and is holding up to 3000 barrels.

Three-quarters of a mile south of this well group a test of the Southern Crude Oil Purchasing Co., numbered T-67, 3-A-1, had water at 436 feet in the lime.

The other main area of encroachment is at the juncture of secs. 33, 34, 41 and 42, affecting the discovery well group. There Pure Oil Co.'s A-1 well, in the southwest corner of sec. 41, now owned by The Texas Co. was recently pinched to 500 barrels daily after showing water. It then dropped to 200 barrels daily, made a 350-barrel all-water head of 350 barrels after shutting-in and reopening, finally giving up oil with a 5 per cent cut. Thereafter, the well was pinched and killed.

Gulf's No. 1 south offset, which originally flowed at the rate of 4400 barrels daily, when completed last spring, is now making as much as 50 per cent water after being pinched to 150 barrels daily flow.

The effect of the appearance of water in the two areas will be the installation of treating plants for dehydration of the oil, also the adopting of measures to prevent undue encroachment in other wells.

Less pay no doubt will be "taken" with the drill in future operations and back-pressuring methods may be followed in safeguarding production from water incursions.

The Hendricks field, which has been rated potentially capable of producing 125,000 to 150,000 barrels daily, open flow, with all wells in the lime drilled in, may have its yield possibilities somewhat cut down. It is, however, still capable of considerable potential production above the present exploited level of 55,000 to 60,000 barrels daily.

Most of the west Texas oil now moving out in tank car shipments comes from this field, which is unrestrained except for its physical limitations. American Petroleum Co., of the J. S. Cullinan group, has been recently shipping about 7,000 barrels of purchased crude daily via railroad loading racks and the Southern Crude Oil Purchasing Co. has been a more extensive shipper.

In October, the Southern Crude shipped nearly 29,000 barrels daily from west Texas to Chalmette Petroleum Corp., New Orleans Refining Co., Liberty Oil Co., Ltd., and Mexican Petroleum Corp., in the New Orleans district; the Standard Oil Co. of Indiana, at Whiting; the San Angelo Refining Co., at San Angelo, and miscellaneous small buyers.

November shipments, the latest for which detailed figures are available, show the Southern Crude and the allied Southern pipeline arm of the Pan American group shipping only 18,917 barrels daily, due in part to the shut down of the affiliated Mexican Petroleum Corp. plant at New Orleans, which it is reported is being mainly dismantled for removal to Curacao, an island off the coast of Venezuela.

Reports credit Mexican Petroleum with planning to leave 5,000 barrels capacity at Destrehan, in the New Orleans district, and rebuild the remainder of the 25,000 barrels dismantled refinery into its new Curacao works.

November figures show the Big Lake Oil Co. making about 1100 barrels daily average shipments from the Big Lake field, Reagan county, in tank cars. This compares with shipments of roundly 1000 barrels to the Rio Grande Refining Co., at El Paso, in October. Marland shipments to the Rio Grande in November averaged 150 barrels daily as compared with 100 barrels daily in October.

The Texas Co., which hereafter will make somewhat larger tank car shipments from McCamey, since its purchase of Pure Oil Co.'s salt basin producing properties, handled about 845 barrels daily in November.

Roxana Petroleum Corp.'s shipments in November averaged 2150 barrels daily in tank cars.

A recapitulation of railroad shipments from Crane-Upton, Winkler and Reagan counties, comprising the entire area of tank car movements from the sulfur crude region of west Texas, shows daily average loadings of 26,724 barrels in November, as compared with roundly 30,000 barrels daily in October and possibly as much as 34,000 barrels daily for December.

150 Drilling Wells In Long Beach Field

Race for Deep Sands

LOS ANGELES, Dec. 31

AT THE close of this week there were 150 drilling wells in Long Beach, all going after the deep sand. Some of the drilling wells are new holes, while a number are deepening jobs. Due to taking off of production of a number of wells the past two weeks, the daily average of the field has not increased very much.

Three new wells in the deep sand the past week averaged better than 3000 barrels each. Hancock Refining Co's Havenstite No. 1 was completed at 5940 feet for flush production of 3000 barrels of 29.2 gravity oil, in addition to 3,500,000 cubic feet of gas. The well increased to 2600 barrels. This well had been producing for the past several months at 4200 barrels, and the well extends the deep sand proven area about half a mile to the northwest. Hancock is drilling four other wells.

Geo. W. Johnson also completed a well in the center of the old field for 3200 barrels of oil at 6018 feet, being the first deep sand producer to make anywhere near 3000 barrels in this area, as previous completions of this size had been on the flank of the field, leading many to believe that the

wells in the center would not be very good. In the west end of the field Eden & Wallace completed a new well for 3700 barrels at 5921 feet.

In the old Seal Beach field, Associated's Bryant 10, which had been producing from the Bixby sand, was deepened to 4875 feet in the Selover and started out making 1000 barrels of clean oil, but increased to 1600 barrels. This indicates that increased production can be expected from the older part of the field, as nine holes are now in process of being deepened from upper to lower sands. There are three sands in this area—Bixby, Selover and Wasem. Old wells producing from the Bixby are being deepened to the Selover, while the Selover producers are being deepened to the Wasem. Only three companies are operating in this area.

At Rincon, Pan American's Hobson fee 3 on the ocean front is making close to a 1000 barrels daily, bottom of hole at 2557 feet, with a string of 13⅜-inch casing cemented at 2536 feet. The oil is clean and 31 gravity with about 300,000 cubic feet of gas. The tubing pressure is 200 pounds while the casing pressure is 400 pounds. Pan American has three other wells drilling below 2500 feet in the same area and if no mechanical trouble is encountered, they will be on production in another two or three weeks. Other companies are drilling seven wells, all below 2500 feet.

In the South Poso area in Kern County, Union Oil Co's Tribe 1 has been placed on production for 275 barrels of 21 gravity oil, with bottom of hole at 1781 feet. It is producing from 51 feet of oil sand. This is an extension to the south of the Poso producing area.

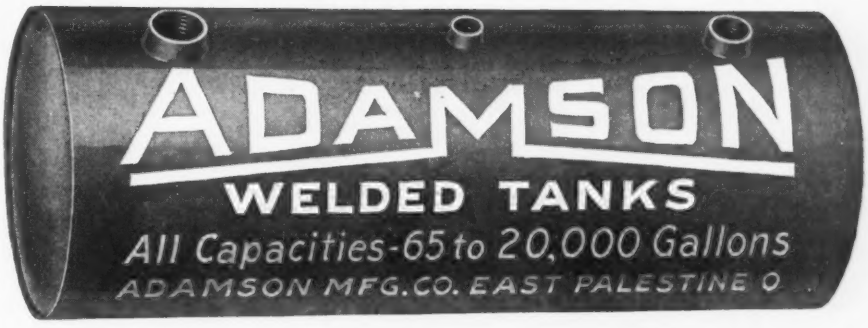
Roark Gains Promotion In Roxana Company

TULSA—R. B. Roark is the new district superintendent of production for the Roxana Petroleum Corp. in the Mid-Continent. He succeeds George S. Rollin, who has been made production manager for the Roxana and who will direct operations from the St. Louis general offices of the company.

Mr. Rollin, widely known figure among Mid-Continent operators, held the position of district superintendent in Tulsa since December, 1925. Prior to that he had been chief of the exploitation engineering department of the Roxana.

Mr. Roark comes to Tulsa from the Ponca City offices of the Roxana where he was district engineer. He has been with the Roxana since 1917.

LOS ANGELES, Dec. 31.—Roy M. Johnson of Ardmore, Oklahoma, official of the Cameron Refining Co. and also an Independent operator of Oklahoma, spent most of December in Los Angeles.



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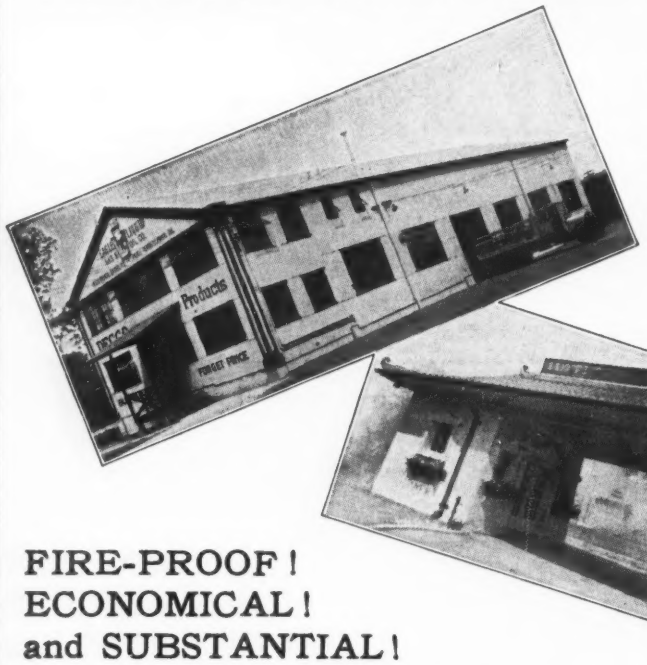

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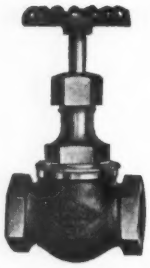

Fig. 106
Screwed, Jenkins Standard Bronze Globe Valve

Fig. 108
Screwed, Jenkins Standard Bronze Angle Valve

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Beaty Out of Texas Corp. But Still an Oil Man

CLEVELAND, Jan. 4.—Both financially and otherwise Amos L. Beaty, who recently resigned as chairman of the board of directors of The Texas Corp., will continue to be interested in the oil business, he stated yesterday over the telephone. Mr. Beaty had held the chairmanship of the directorate only a little over a year, having served as president of The Texas Co. for several years previously.

He would not state, however, just what his affiliations or activities in the business are to be in the future.

Mr. Beaty had been associated with The Texas Co. since 1907, starting in in the legal department. Recognized as an outstanding lawyer, particularly versed in the law as it applies to various phases of the oil business, Mr. Beaty was chairman of the American Petroleum Institute committee to consider whether legislation should be approved by the industry making it possible for companies to get together to regulate production in flush pools at times when uneconomic production was threatened. This committee reported in favor of legislation at the recent meeting of the Institute.

Asked whether he would continue as chairman of this committee, Mr. Beaty replied that he considered the work of the committee and the committee itself at an end but that he expected to keep up his active interest in the affairs of the American Petroleum Institute.

To Prorate Yates Field On Acreage Basis

HOUSTON, Jan. 2.—Yates field operators of Pecos county, Jan. 1, began prorating a market outlet of 48,000 barrels daily on the acreage basis agreed upon at a meeting held in Fort Worth, Dec. 12. An alternative plan proposed by Simms Oil Co., Dallas, which recently filed objections to the prorating method now in use will be considered at Fort Worth Jan. 6. The Simms plan is a combination of the acreage yardstick and the old potential production basis used for computing runs percentages.

Important new wells in the Yates field include the new B-17 Yates of the Mid-Kansas and Transcontinental partnership, in sec. 61, I&GN block 1, Pecos county, which tested 950 barrels in one hour at 1075 feet; and the Leon & Wrightsman No. 1 H. M. Halff, across the river in sec. 70, Crockett county, which tested 160 barrels in the first eight minutes at 1050 feet.

99% of Sales at Atlanta Stations Are Gasoline and Oil

THE service station business in the south is much like that in other sections of the country, if the retail distribution survey of 1926 made by the U. S. Department of Domestic Commerce at Atlanta, Ga., is an index.

Gasoline and oil sales accounted for $6,372,800 of a total business of $6,431,700 done at Atlanta service stations in 1926. Sales of auto parts and accessories amounted to $52,000; of tobacco $1,900; and of candy, ice cream and soft drinks $5,000.

In other words, gasoline and oil brought in 99.08 cents out of every dollar taken in at the stations. This data for Atlanta is virtually the same as for Baltimore where gasoline and oil sales at service stations amounted to 97.25 per cent, in Syracuse 96.61 per cent and in Denver 98.55 per cent.

The Atlanta survey covers retail sales made in 1926 at 43 different kinds of merchandising business. Retail houses were classified according to the commodity bringing in the largest volume of sales, and all data by retail outlets compiled into tables showing total volume of business done in each commodity. Other cities which have been surveyed are Chicago, Kansas City, Fargo, Providence, San Francisco and Springfield, Ill. Tabulations are being made by the U. S. Chamber of Commerce and analysis of these government reports will be published later in NATIONAL PETROLEUM NEWS.

Atlanta is a $177,782,800 retail mar-

AN ANALYSIS of data on retail distribution of gasoline and oil in Atlanta in 1926, compiled by U. S. Department of Domestic Commerce, is published herewith. This survey has been made in 11 cities, representative of different types of population and various types of business activity.

Readers desiring to make a more comprehensive comparison of data from various cities than is made in this article will find the Baltimore survey in NATIONAL PETROLEUM NEWS issue of Nov. 9; Syracuse survey in the issue of Nov. 16; and the Denver survey in the Nov. 30 issue. Analysis of the remaining seven cities will be published in NATIONAL PETROLEUM NEWS, as the reports are issued by the government.

Complete reports for each city may be obtained from the Domestic Distribution Department of the Chamber of Commerce of the United States, Washington, at 25 cents a copy.

CLASSIFICATION OF RETAIL BUSINESS IN ATLANTA IN 1926

This table includes oil products and statistics on total sales, persons employed, wages and inventory as shown in special census report of U. S. Department of Domestic Commerce.

Kind of Business	Number of Establishments	Persons Engaged and Wages: Employes	Firm Members and Proprietors	Total	Salaries and Wages*	Inventory† Average for Year	Net Sales	Percent of Total Sales
Art and Antique	9	41	9	50	$ 36.700	$ 79.000	$ 355.600	.20
Auto Accessory	86	447	78	525	619.400	784.100	5.429.000	3.05
Automobile	29	591	13	604	1,147.000	1,486.200	12.992.600	7.31
Bakeries	26	321	18	339	372.300	41.000	1.703.000	.96
Boot and Shoe	61	307	32	339	453.500	733.500	3.918.400	2.20
Building Material	41	540	25	565	826.400	606.200	7,547.800	4.25
Undertakers' Supply	8	30	5	35	38.700	45.200	200.600	.11
Cigar and Tobacco	38	82	36	118	94.900	86.600	999.600	.56
Clothing, Women's	29	303	19	322	342.700	312.500	2,727.500	1.53
Clothing and Furnishings, Men's	107	671	97	768	903.000	1,876.700	8.876.200	4.99
Coal, Wood and Ice	44	972	30	1,002	1,001.200	413.600	6.149.500	3.46
Confectionery, Ice Cream and Soft Drinks	180	627	179	806	633.300	243.800	3,539.800	1.99
Custom Tailors	18	123	17	140	139.300	50.100	619.200	.35
Dairy and Poultry Products	23	113	24	137	126.200	33.700	1.042 600	.59
Department	13	2.286	7	2.293	2.640.700	2,903.900	18.766.600	10.56
Drug	232	1,175	215	1,390	1,079.800	1,154.900	8.526.000	4.80
Dry Goods and Notions	62	99	67	166	110.100	316.400	1.127.700	.63
Electrical Supplies	33	179	33	212	276.800	350.000	2.061.900	1.16
Five and Ten Cent	11	490	3	493	392.100	450.500	3.549.800	2.00
Florists	28	260	21	281	316.300	251.200	2,051.400	1.15
Fruit and Vegetable	53	31	57	88	26.100	9.600	333 800	.19
Housefurnishings	100	810	85	895	1.238.400	1.373.500	8.278.400	4.66
Gasoline and Oil	196	983	62	1.045	1.027.900	234.000	6 437.400	3.62
General	15	72	14	86	89.400	118.900	834.400	.47
Grocery and Delicatessen	1,314	2,090	816	2,906	2,707.500	2.055.500	30.842.400	17.35
Hardware	57	294	31	325	560.200	1,124.600	5,472.100	3.08
Hat and Cap, Men's and Boys'	7	19	3	22	26.100	30.300	244.200	.14
Hay, Grain and Feed	18	29	15	44	24.000	30.900	445.100	.25
Jewelry	54	201	52	253	355.800	1,170.300	2,261.800	1.27
Junk	9	18	11	29	14.400	20.800	139.500	.08
Leather Goods	15	43	14	57	69.900	161.900	658.800	.37
Meat, Poultry and Fish	157	314	160	474	327.200	148.500	4.095.500	2.30
Millinery	27	163	16	179	205.400	69.700	1,236.200	.70
Motorcycle and Bicycle	8	12	8	20	11.800	11.100	84.000	.04
Musical Instruments	23	191	24	215	305.500	356.100	2.158.900	1.21
Office Equipment	30	319	17	336	626.900	483.800	4.608.500	2.59
Optical Goods	19	95	18	113	196.500	136.800	1.117.700	.63
Paint, Varnish and Glass	19	116	5	121	187.400	302.100	1.237.200	.70
Plumbing Supply	39	171	29	200	296.300	124.000	1.871.300	1.05
Restaurants	433	1,731	481	2,212	1,158.800	152.200	6,718.900	3.78
Sporting Goods and Camera	7	35	8	43	35.600	99.400	385 000	.22
Stationery, Book and Magazine	29	238	24	262	331.200	212.300	1,723.500	.97
Typewriter	13	161	4	165	273.600	132.200	965.900	.54
Unclassified	29	173	23	196	256,400	277.200	3,447.500	1.94
TOTAL	3,749	17,966	2,905	20,871	$21,902,700	$20,955,800	$177,782,800	100.00

*Exclusive of compensation or earnings of Proprietors and Firm Members.
†At Cost.

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ket. This business was done in 3,749 establishments in 1926. Of this number, 2,736 were independently owned and had sales of $123,280,900 while 1,013 chain stores did $54,501,900.

There were 196 gasoline and oil establishments doing a net business of $6,437,400. This is 3.62 per cent of the total volume of retail sales, ranking gasoline and oil ninth of 43 classifications in total volume of sales.

In the average sales of each establishment gasoline and oil ranks well down the list, being 32nd of the 43 classifications. In Baltimore gasoline and oil ranked tenth of 44; in Syracuse twelfth of 44; and in Denver nineteenth of 46 classifications. Atlanta sales per establishment were $32,844, while the average for all business was $47,421.

A FURTHER study of the data may explain why the Atlanta stations did a low volume of business on the average. Atlanta's population, used in the survey, was 244,100. With 196 stations there were 1,245 inhabitants per selling unit. Baltimore, with a population of 792,296, had 221 service stations, or 3,656 inhabitants for each station; Syracuse had 2,467 inhabitants per station; and Denver 928. Denver stations, however, had a large volume of business, 6.38 per cent of the total retail sales, and gasoline and oil there ranked fifth in sales per capita, or $34.85. The reason for this larger volume of business in Denver is heavy tourist trade there.

Atlanta sales of gasoline and oil per capita were $26.37. Total sales per capita were $728.32. Gasoline and oil ranked ninth, above hardware, boot and shoe, jewelry, women's clothing stores. As in Baltimore and Denver, automobiles in Atlanta, on a per capita basis, ranked third while in Syracuse automobiles was second. Department stores, of course, come first.

Employes at Atlanta service stations totaled 983, proprietors and firm members 62, and the total 1,045. These 983 employes received $1,027,900 in wages or 15.97 per cent of net sales There were only seven other classifications of business that contributed more to the total Atlanta retail payroll than gasoline and oil. The average wage at stations was $1,046, while the average retail wage in all lines was $1,219.

Inventories, based on the yearly average, were $234,000 or $1,194 for each station. The actual inventory Dec. 31, 1926, was $309,800 or $1,581 for each station. This data is approximately the same as for Denver and Baltimore, while Syracuse carried a higher inventory.

At service stations sales of gasoline and oil amounted to 99.08 per cent of total sales, auto parts and accessories .81 per cent; tobacco .03 per cent, and candy, ice cream and soft drinks .08 per cent.

On a commodity basis, total sales of gasoline and oil were $6,568,900, from 248 outlets. In addition to the 196 service stations, there were outlets for sale of gasoline and oil at eight auto accessory stores, 27 grocery and delicatessen stores, three restaurants and three automobile sales places, two candy stores and one cigar store, one drug store and one meat market.

As in the other cities surveyed,

Table No. 1

Average sales per establishment for various kinds of retail business in Atlanta in 1926:

Department	$1,443,585
Automobile	448,021
Five and Ten Cent	322,709
Building Material	184,093
Office Equipment	153,617
Coal, Wood & Ice	139,761
Hardware	96,002
Clothing, Women's	94,052
Musical Instruments	93,865
Clothing, Men's	82,955
Housefurnishings	82,784
Typewriter	74,300
Florists	73,264
Bakeries	65,500
Paint, Varnish & Glass	65,116
Boot & Shoe	64,236
Auto Accessory	63,128
Electric Appliance	62,482
Stationery, Book & Magazine	59,431
Optical Goods	58,826
General	55,627
Sporting Goods, Cameras	55,000
Plumbing & Heating	47,982
Millinery	45,785
Dairy & Poultry Products	45,330
Leather Goods	43,920
Jewelry	41,885
Art & Antique	39,511
Drug	36,750
Hat & Cap, Men's	34,886
Custom Tailors	34,400
Gasoline & Oil	32,844
For all kinds of business	47,421

Table No. 2

Sales per capita to the kind of retail business in Atlanta in 1926:

Grocery & Delicatessen	$126.35
Department	76.88
Automobile	53.23
Clothing Men's	36.36
Drug	34.93
Housefurnishings	33.91
Building Material	30.92
Restaurants	27.53
Gasoline & Oil	26.37
Sales per capita for 44 kinds of business classified	728.32

Table No. 3

Sales of all commodities at gasoline stations in Atlanta in 1926:

Auto parts and accessories	$ 52,000
Cigars and cigarettes	1,900
Candy, ice cream and soft drinks	5,000
Gasoline and oil	6,372,800
Total sales	6,431,700

Table No.4

Retail outlets for gasoline and oil in Atlanta for 1926 and volume of sales where possible to ascertain:

Auto accessory	8	119,900
Automobiles	3	16,600
Candy	2	.....
Cigars and tobacco	1	.....
Drug	1	.....
Gasoline and oil	196	6,372,800
General	6	12,900
Grocery & delicatessen	27	30,800
Meat, poultry, fish	1	.....
Restaurant	3	4,600
Unclassified	.....	11,300
Total	248	6,568,900

the bulk of the total gasoline sold was through stations, and stations did 96.99 per cent of the gasoline and oil business in Atlanta. Auto accessory stores did 1.83 per cent, automobile sales places .25 per cent, grocery and delicatessen .47 per cent, restaurants .07 per cent, unclassified .17 per cent, and general .20 per cent.

On this commodity basis, gasoline and oil total sales ranked fourth of 69 classifications of goods. Dividing these 69 classifications into 13 groups, the automotive group ranks third, total sales being $24,848,400, or 13.98 per cent of total sales for all groups. In this group sales of automobiles, tractors and trucks amounted to $11,955,500; gasoline and oil $6,568,900; automobile parts and accessories $6,239,300; and for motorcycles and bicycles $84,700.

Tide Water Subsidiary to Build at Norfolk

NORFOLK, Va., Dec. 31.—Colonial Oil Co., a marketing subsidiary of the Tide Water Oil Co., has bought eight acres on the south branch of the Elizabeth river on which it will erect storage for 500,000 gallons of petroleum products. The site is near the terminals of The Texas Corp., Sinclair Refining Co., National Oil Co., and Mexican Petroleum Co.

The Colonial's site cost $50,000. It has 300 feet of water frontage and tankers that draw down to 23 feet of water may dock at piers Colonial will build, according to Arthur Hitch, Norfolk investor, who sold the property to Colonial.

Other large companies are planning to build terminals at Norfolk, including Gulf Refining Co., Sun Oil Co., and Pure Oil Co., Mr. Hitch said.

CHICAGO, Dec. 31.—John T. Owen, Tulsa, formerly chief engineer of Barnsdall Refining Co., was recently elected vice-president of Seymour-Howard Corp., manufacturing chemists, 601 W. 53rd St., Chicago.

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U. S. Circuit Court of Renders Decision

Subject: The Permutit Company

AS is well known, the Permutit Company is suing Paige & Jones Chemical Company, Inc., for infringing upon claim five of the Gans patent.

The lower Federal Court held that because the brine, after regeneration, was removed from a low point of the casing and that this step was included in the fifth claim of the Gans patent, a preliminary injunction should be ordered.

Upon appeal, the United States Circuit Court of Appeals, Second Circuit, ruled* that there should

*Copies of the decision of the U. S. Circuit Court of Appeals, Second Circuit, will be sent to any parties interested in reviewing the full details. And also events that have led up to this decision.

In passing, it may be of interest to know that Paige & Jones engineers have just perfected important changes that make the rapid-rate, upward flow zeolite softeners even more efficient and economical and these latest models are entirely free of any legal entanglements.

Full information on request.

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Rapid-Rate Upward Flow Zeolite Softeners

Review of Developments in Equipment Applicable to Plunger Pumping

By Lester C. Uren
Professor of Petroleum Engineering, University of California

Article 4

PRECEDING articles of this series have dealt with the principles of plunger pumping, and have described in some detail, the various types of pumps that have found use in oil-well pumping service. The present article reviews recent progress in the development of various oil-well pumping accessories and improvements in well equipment, apart from pumps, that find application in plunger pumping.

Sucker Rods

Outstanding improvements have been made within the last few years in the quality and design of sucker rods used in connecting the pump plunger with the source of power at the surface. This has been made necessary by the ever-increasing depth from which production has been secured in many of the more recently discovered fields—depths from which, a few years ago, it would have been impossible to lift oil with the equipment then available.

In an earlier article of this series,[1] the results of computations were cited, which indicated that in wells 4,000 feet or more deep, the static and dynamic loads imposed on the sucker rods may create stresses in excess of the elastic limit of ordinary steels. For deep-well pumping, ¾-inch or ⅞-inch rods are commonly used—rarely, 1-inch. For ordinary steels having a tensile strength of 60,000 pounds per square inch and an elastic limit of say, 40,000 pounds, the safe working loads may not exceed 17,600 and 24,000 pounds respectively, for ¾-inch and ⅞-inch rods. However, with 2½-inch and 3-inch pumps in deep wells, and with the long beam stroke necessary to offset the elastic stretch of the sucker rods, the load will often be greater than 24,000 pounds. Increasing the rod diameter to 1-inch or more provides only moderate additional security, for the greater weight of the larger rods increases both the static and dynamic loads, and the heavier rods complicate the problem of equalizing the loads as between the up and down strokes.

Greater security against rod breakage under tension, may also be secured by using a slower rate of plunger travel, or a working barrel of smaller diameter, but either of these expedients would reduce the pump capacity, possibly curtailing the productivity of the well. Rod manufacturers are therefore striving to meet the problem of sucker rod breakage in deep-well pumping by the direct method of developing steels of greater strength.

IMPORTANT progress has been made in this direction during recent years by careful selection and heat treatment of steels, some manufacturers now claiming that their rods are capable of developing an ultimate breaking strength as great as 114,000 pounds per square inch, and an elastic limit of upwards of 71,000 pounds.[2] Rods of even greater tensile strength can be manufactured through the use of alloy steels (i.e. chrome, vanadium, manganese and nickel steels), but rods of such materials would be considered prohibitive in price by most oil producers, and are said to lack the ductility characteristic of heat-treated steels of low-carbon content.[3]

Ductility is, of course, an important characteristic in the selection of sucker rods, for a brittle steel would be unable to resist the continual snap and jar developed by frequent stress

THIS is the fourth of a series of Uren articles dealing with the principles, practices and equipment used in lifting oil from wells with the plunger type of pump. Earlier articles of the series have been concerned with a discussion of principles and with descriptions of construction details of various types of oil-well plunger pumps.

The present article is devoted to a survey of a variety of appliances, many of them but recently developed, which assure greater security and longer life of pumping equipment, and to a discussion of the problems presented in the development and selection of sucker rods and tubing for deep-well pumping service.

The next and concluding article of this series, which will appear in an early issue of NATIONAL PETROLEUM NEWS, will discuss the problems involved in the application of power to oil-well plunger pumping.

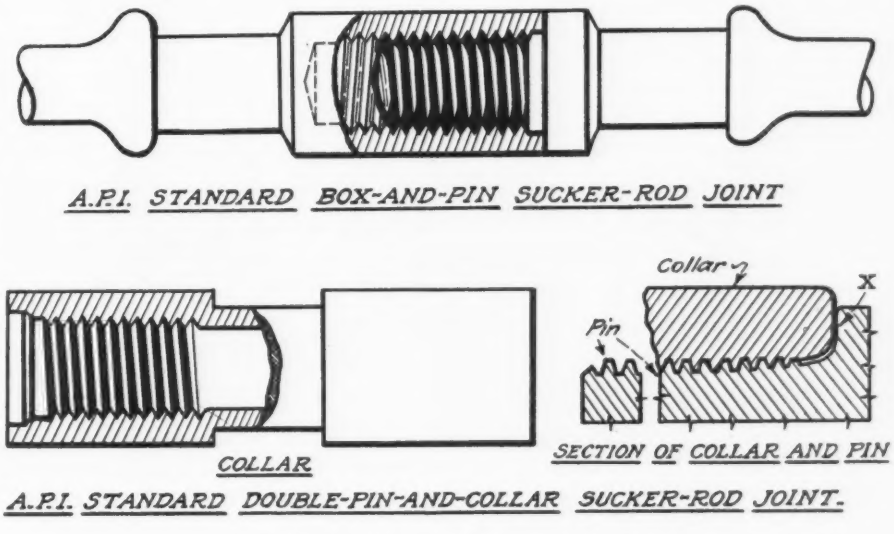

Fig. 1. Standard types of sucker-rod joints

1. See NATIONAL PETROLEUM NEWS, issue of Oct. 26, 1927.

2. Cassidy, H. E. "Engineering Problems in the Manufacture of Sucker Rods for Deep Wells," Oil Field Engineering, Aug. 1927, p. 59.

3. Crook, W. J., "Heat-Treated Sucker Rods Reduce Failure by Breakage." NATIONAL PETROLEUM NEWS, June 29, 1927, pp. 85-93.

reversal. High-carbon steels develop greater tensile strength than low-carbon steels, but are unsatisfactory for sucker rod manufacture because of their characteristic brittleness.

Elasticity in a sucker rod metal is doubtless an important characteristic particularly in deep-well pumping, for on this property depends its ability to maintain the beam stroke. Elongation under stress may partially if not completely offset the stroke of the beam in a long, slow-moving column of sucker rods, but the elastic "lift" and "reach" developed in a column of rods by a properly synchronized beam motion, may result in a plunger movement equal to if not greater than that of the beam.[4] This action of the rods is directly a function of the elasticity of the metal. Burnett[5] has determined the elastic elongation coefficients or moduli of elasticity of a variety of sucker rod steels, and reports values ranging from 0.00321 to 0.00351 per cent.

While the elastic limit of sucker rod steel often determines the maximum working load to which the rods may be subjected, it is found in practice that rods may have a very short life, even though the elastic limit is not exceeded. This is due to a property of metals termed "fatigue." Failure due to fatigue is occasioned by frequent and severe reversals of stress, which result in rupture of the metal along its component crystal planes.

The fatigue resistance of steel is a highly variable property, but tests have shown that in most cases, failure due to fatigue will occur at stresses approximating 50 per cent of the breaking strength of the metal.[3] If this value is lower than the elastic limit, it will determiine the maximum stress to which it is safe to subject the rods in continuous service.

When it is considered that sucker rods in wells that are pumped continuously, are subjected to upwards of 25,000 alterations of stress daily, it is not surprising that the great majority of rod failures is due to metal fatigue. Failure due to this cause is easily identified, for the rod lacks the characteristic "necking down" of the metal that results in failure due to application of strain in excess of the elastic limit. The metal fracture will often present a crystalline appearance, parting being along the crystal faces. Often the point of failure will be determined by some local irregularity in the texture or cross-section of the metal, such as a segregation of certain constituents of the steel, which occasionally results in the process of manufacture of the metal or in its subsequent heat treatment. Short bends in the rods, nicks, or even minor scratches on their surface, will be centers of abnormal strain in the metal, greatly reducing its resistance to fatigue. It has been shown that rods having highly polished surfaces have a greater fatigue resistance than rough finished rods.[6]

Security against parting in a "string" of sucker rods, is vitally dependent upon proper design and manufacture of the joints. Rods may be had in 20 or 30 foot lengths, but the latter are preferable since there will be 33-1/3 per cent fewer joints at which failure may occur. In modern methods of rod manufacture, the joints are formed by up-setting and forging the ends of the rods to form the particular type of joint desired. The "box-and-pin" joint in which one end of each rod is equipped with an internally threaded box while the opposite end is provided with an externally threaded pin, has been widely used, but many operators now prefer the "double-pin" type of joint, in which each end of the rod is equipped with a threaded pin, while a double-box rod coupling is

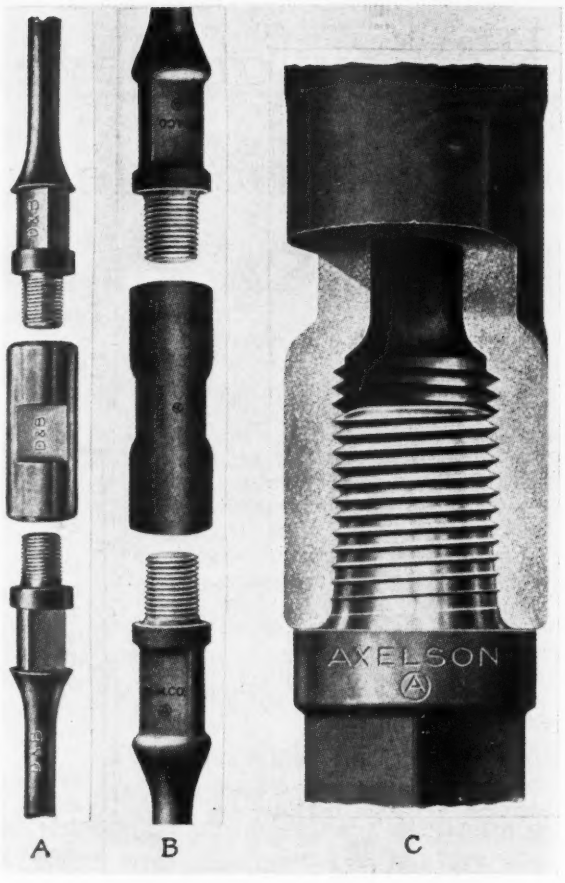

Fig. 2. Typical double-pin-and-collar sucker rod joints. A—D. & B. joint, using Whitworth threads. B—Axelson joint, using "vanishing" threads. C—Detail of vanishing threads.

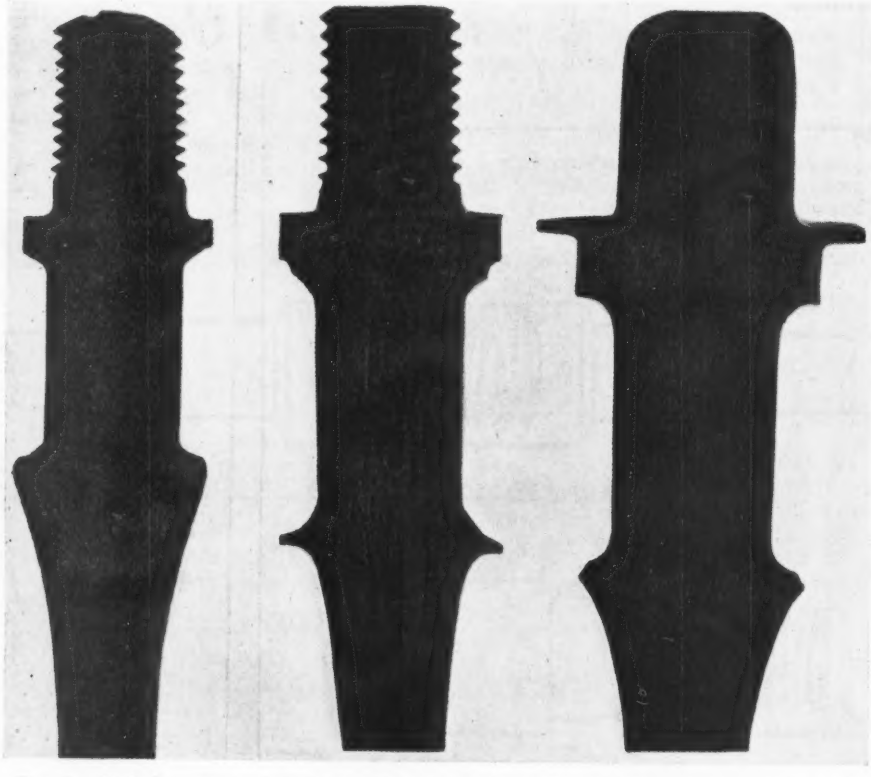

Fig. 3. Etched sections of sucker-rod joints, showing effect of heat-treatment and forging methods on fibre of steel (Courtesy of S. M. Jones Co.). The two specimens, at the left and center, are improperly, that at the right properly treated and forged.

4. For further discussion of this phenomenon, see an earlier article of this series in National Petroleum News, issue of Oct. 26, 1927, pp. 69-71.
5. Burnett, R. N., "Problem of Selecting Sucker Rods", Oil and Gas Journal, Sept. 22, 1927, pp. 137, 302.
6. Moore and Kommers, "Fatigue of Metals", McGraw-Hill Book Co., 1927.

used to couple the rods together. Both types of joints are illustrated in Figure 1. Wrench squares are forged, both on the rods and couplings, to facilitate coupling and uncoupling. (See Figure 2.)

Many rod failures can be traced to improper methods of forging and heat treatment, which may leave incipient fractures in the metal at the up-set ends, particularly in the vicinity of the wrench squares, and which leave the crystalline fibre of the metal distorted and under abnormal stress. (See Figures 3 and 4.)

The type of thread used on sucker rod joints, pitch and length of threads and other details of design, have varied widely among different rod manufacturers, but efforts of the American Petroleum Institute to standardize sucker rod joints, promise greater uniformity in this regard for the future. The Committee on Standardization of Pumping Equipment of the Institute, recently adopted specifications in which every detail of the sucker rod joint is rigidly prescribed, and it is probable that most rod manufacturers will adhere to the specifications so determined.[7] When this is realized, rods will be interchangeable, so that the products of two or more different manufacturers may be used if desired, in making up a "string" of rods. The A.P.I. standard sucker rod joint, illustrated in Figure 1, provides a pin of greater than normal diameter, threaded with U. S. Standard, flat-top 10-pitch threads. "Vanishing" threads are provided toward the base of the pin, in order to provide additional metal to resist breakage at this point. A further precaution against pin breakage is found in the provision of a fillet between the pin cylinder and collar.

Continual abrasion of the sucker rods against the inner surface of the tubing, results in wear of both. In the case of the rods, the greater part of this wear falls on the rod joints, because of their greater diameter. Herein the coupling type of joint has a considerable advantage over the box-and-pin type of joint, for the wear falls chiefly on the collar, which can be replaced at small cost, while a worn box-and-pin joint can only be replaced by forging and rethreading the box, or by welding on new rod ends. The new A.P.I. coupling joint provides a coupling of somewhat greater diameter than has been usual, in order that it may resist tubing friction for a greater length of time. Rod couplings should shoulder against the pin collar as shown at "X" in Figure 1, in order to provide greater security against pin breakage.

Sucker-rod guides, designed to clamp about the rods near the joints, may be used to advantage in the box-and-pin type of joints. (See Figure 5.) These guides are larger in diameter than the rod joints, and take the greater part of the tubing wear. They must be made of metal softer than that used in the tubing, in order that the latter may not be unduly scored as the guides reciprocate up-and-down with the rods. A type of sucker-rod guide adapted to the coupling type of joint, is also available. (see Fig. 5B), in which a three-winged guide is cast about the coupling.

The tubing on which the pump working barrel is suspended, and through which the well fluid is pumped to the surface, is subjected to the same character of strain as are

7. The complete report of the Committee on Standardization of Pumping Equipment, presented at the Colorado Springs Standardization meeting of the A.P.I., in June, 1927, was printed in the Oil and Gas Journal, issue of Sept. 22, 1927, p. 267.

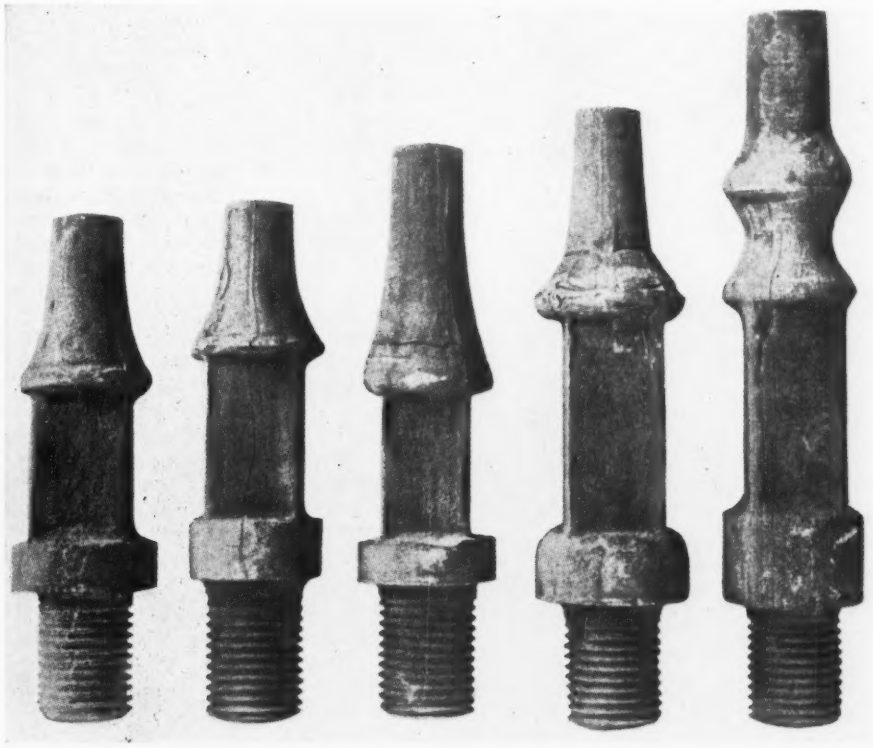

Fig. 4. Etched sucker-rod joints, showing effect of forging and heat-treatment on quality of the metal in vicinity of the wrench squares. (Courtesy S. M. Jones Co.). Joint at right is properly, others improperly forged and treated.

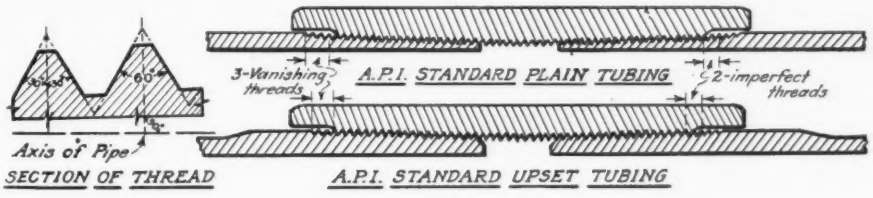

Fig. 6. Standard types of oil-well tubing.

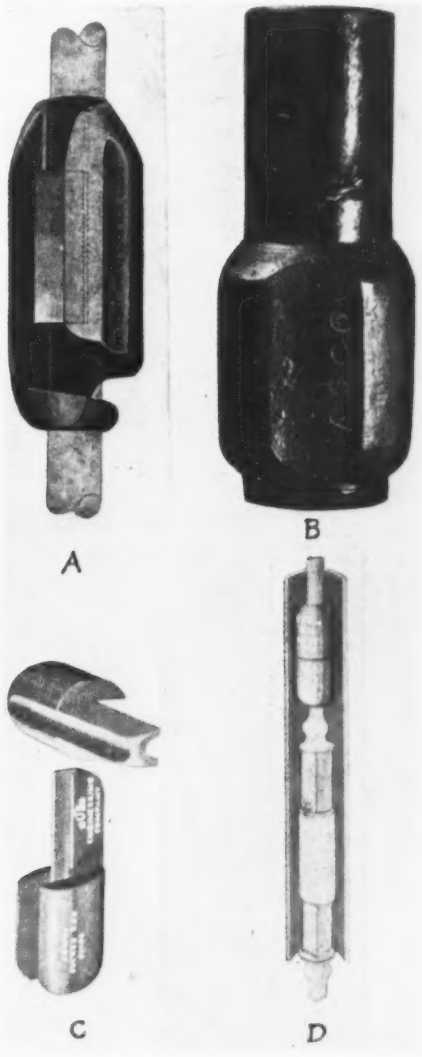

Fig. 5. Types of sucker-rod guides. A—Peerless spring-lock guide. B—American Supply Co. guide, case on rod collar. C and D—Erwin rod guide; C—disassembled; D—assembled.

the sucker rods, and tubing failures are a frequent source of trouble and expense in oil-well pumping. As has been shown in a previous article of this series,[8] the tubing must suffer a considerable variation in stress with each stroke of the plunger, which may lead to fatigue failure. It must also undergo an elastic elongation and contraction with each stroke of the plunger, which in a long column of tubing in a deep well, probably results in a movement at the lower end of several inches. This elastic elongation and contraction of the tubing with each stroke of the pump, causes abnormal wear on the tubing collars and casing, and throws a considerable strain on the threaded joints, often occasioning parting of the tubing by failure of the metal at the base of the threads near the ends of the couplings. A possible means of reducing this destructive elastic movement of the tubing, is to anchor it at or near its lower end, with an anchor packer or trip casing spear, as well as at the casing head. Frequent failure of plain tubing as a result of reducing the thickness of the metal at the joints by cutting threads, has led to the wide-spread use of up-set end tubing, in which the metal walls at the ends of each joint of tubing are locally increased in thickness to compensate for the metal sacrificed in the cutting of threads.

8. See National Petroleum News, issue of Oct. 26, 1927, p. 71.

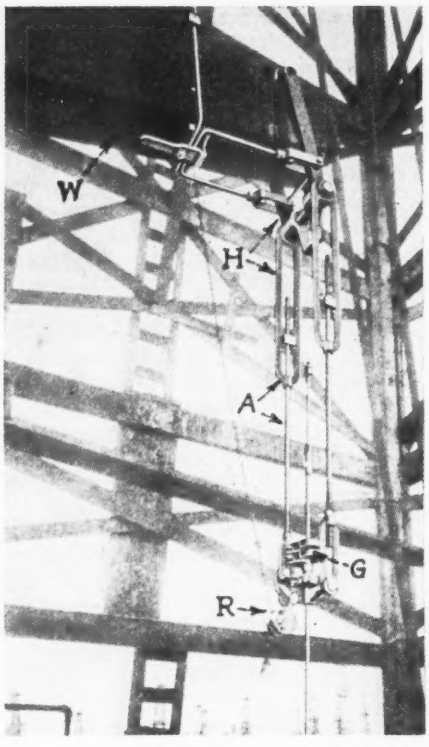

Fig. 7. Sargent level-fulcrum beam hanger. (Courtesy Sargent Eng. Corp.) W—walking beam. H—beam hanger. A—adjuster rods and links. G—polish rod grip. R—Sargent rod rotor.

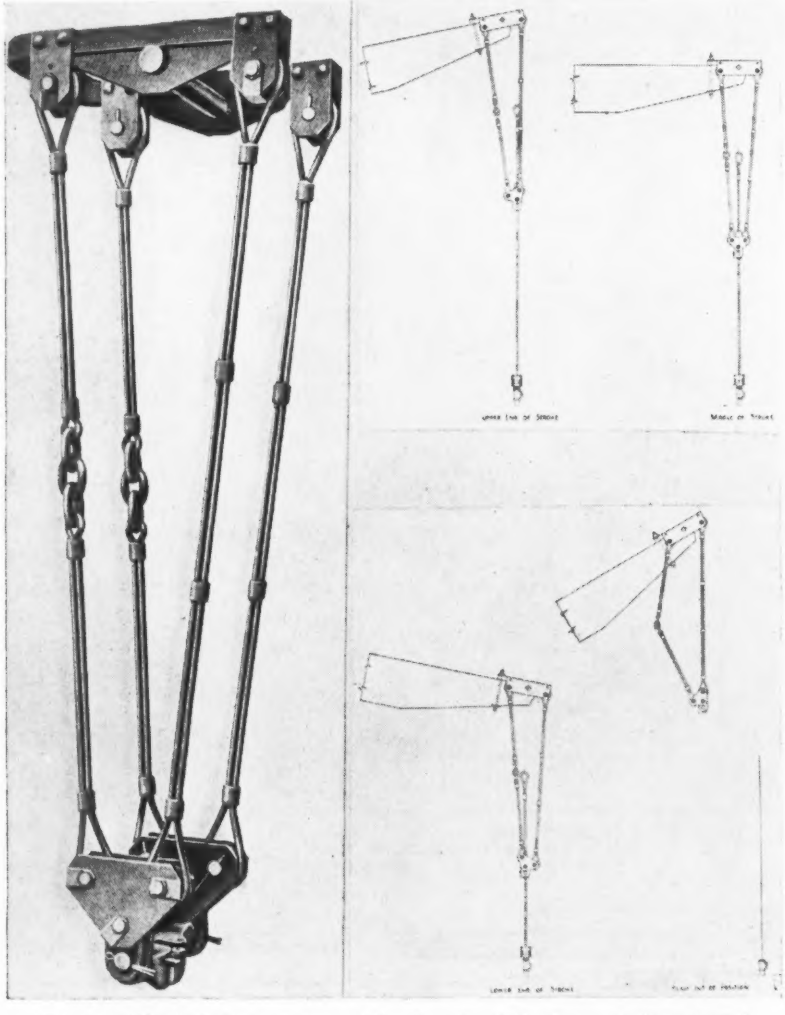

Fig. 8. "Simplex" beam hanger. (Courtesy D. & B. Pump & Supply Co.)

Progress toward the standardization of oil-well tubing and tubing joints, has been made recently by the American Petroleum Institute Committee on Standardization of Pumping Equipment, referred to in the preceding section. Standard sizes of tubing and specifications on collared joints, were proposed more than two years ago by the Institute Committee, but have only recently been finally adopted. During this two-year interval however, upwards of 11,000,000 feet of tubing manufactured to meet A.P.I. specifications, has been sold to oil companies.[9]

Figure 6 illustrates the principal features of both plain and up-set end A.P.I. standard tubing. It will be noted that a longer than normal coupling, with long thread engagement, is provided, thus contributing greater security against parting and leaky joints. Collars are recessed at the ends to facilitate stabbing and to prevent cross-threading in making up joints. When it is considered that a 4,000 foot string of 2¼-inch upset tubing will weigh as much as 29,000 pounds, and that all of this weight must be suspended from the surface joints, the necessity for maximum security and dependability in the joints and in the quality of the material is apparent.

A.P.I. plain tubing of normal sizes, is threaded with 11½ threads per inch, while 10 threads are used on upset-end tubing. The only exceptions are found in the use of 10 threads per inch on 3½-inch and 4-inch plain tubing, and 11½ threads on 1¼-inch and 1½-inch upset tubing. Standard sizes provided include 2, 2½, 3, 3½ and 4-inch plain tubing, and 1, 1¼, 1½, 2, 2½, 3, 3½ and 4-inch up-set end tubing. The 3½-inch and 4-inch sizes are used in tubing wells for production with the gas-lift rather than by plunger pumping. Briggs standard pipe thread is used, tapered with respect to the axis of the pipe, and with flattened crests and troughs on the 60 degree V-shaped threads, as illustrated in Figure 6.

Tubing and Sucker Roll Appliances

A variety of different devices have been developed and are finding extensive use in better adapting rods and tubing to the required service in deep-well pumping, providing greater security against wear and breakage, and greater facility in handling. Among these, the many different devices employed in connecting the column of rods with the source of power—the walking-beam, the jack or pumping "unit"—are

(*Continued on Page* 62)

9. Swigart, T. E., "Value of Use of Pumping Standards", a paper read before the Chicago meeting of the American Petroleum Institute, December, 1927. Printed in Oil and Gas Journal, issue of Dec. 8, 1927, pp. 114, 117.

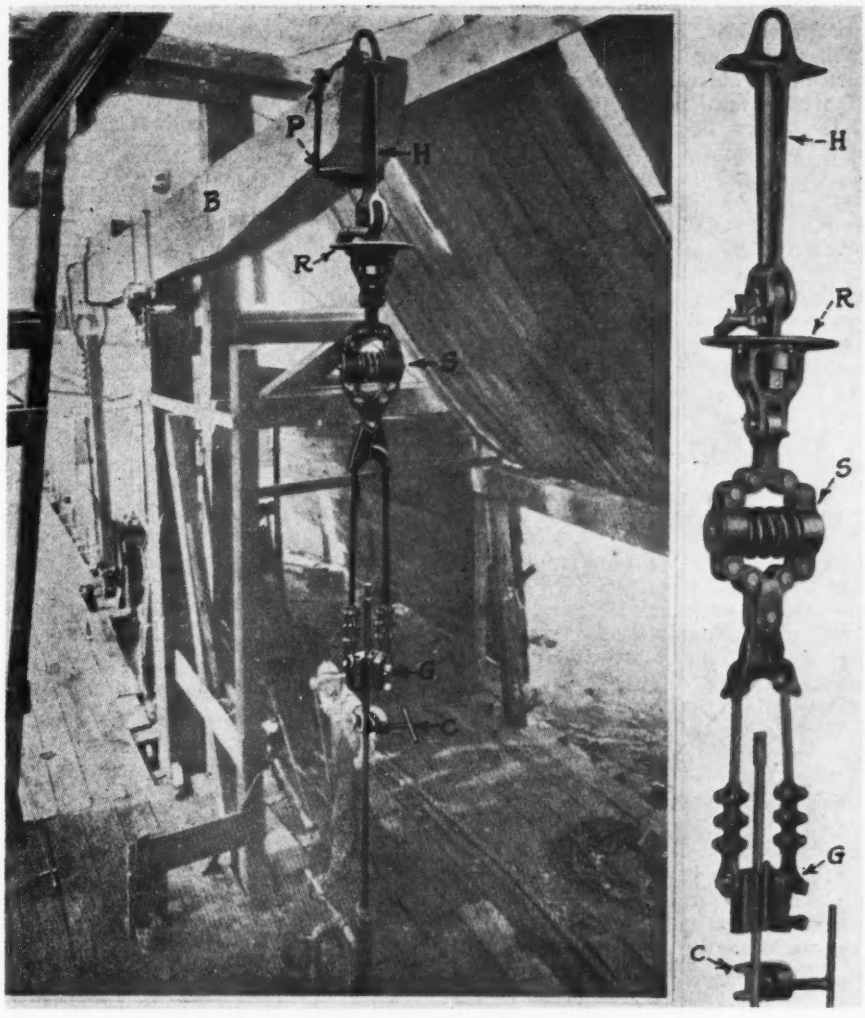

Fig. 9. Ratigan beam hanger, shock absorber and rod rotor. (Courtesy J. P. Ratigan Co.) B—walking beam. H—Beam hanger. P—beam-hanger plates. S—shock absorber. G—rod grip. C—clamp. R—rod rotor.

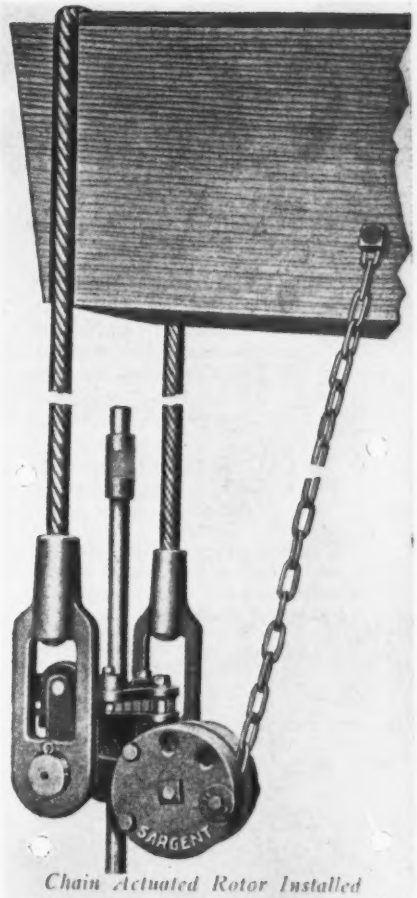

Fig. 10. Sargent chain-actuated rod rotor. (Courtesy Sargent Engineering Corp.).

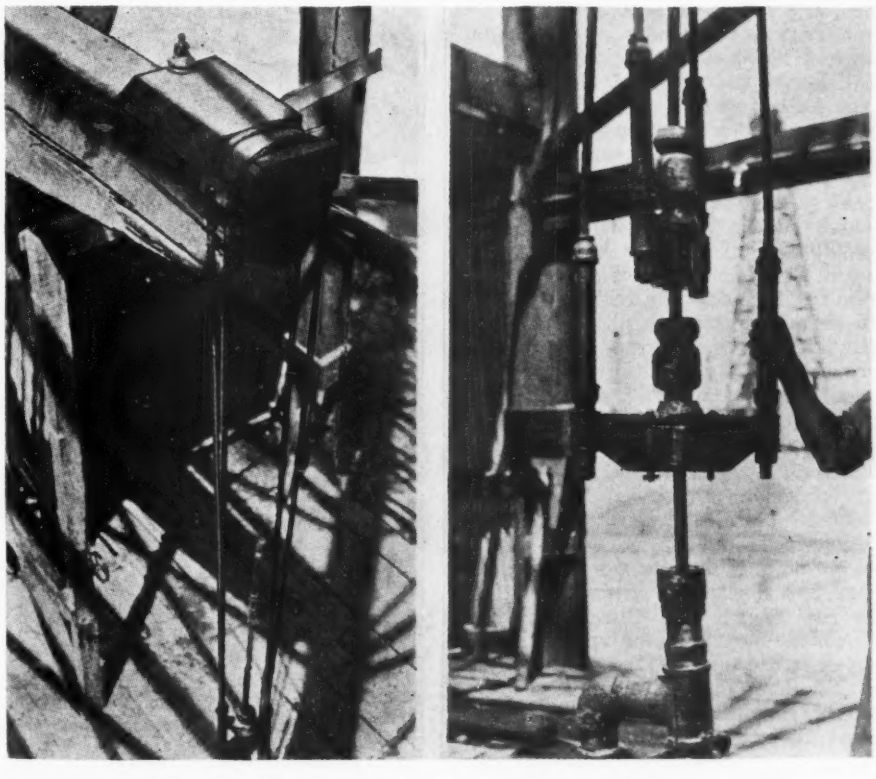

Fig. 11. Rope-sling sucker-rod rotator. (After L. Suverkrop.) At left—showing manner of attaching slings to beam. At right—showing clamps on lower end of slings, supporting polish rod.

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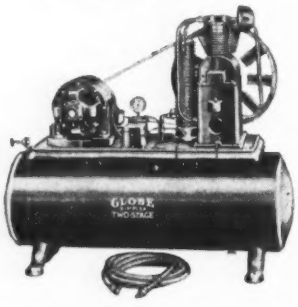

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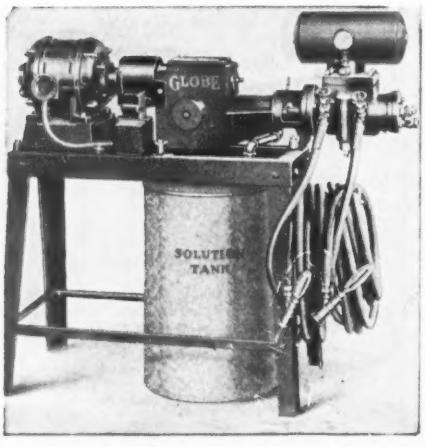

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(*Continued from Page* 60)

worthy of brief description. Rod and tubing rotating devices, which have for their objective the distribution of wear occasioned by movement of the plunger in the working barrel, and by scraping of the rods against the tubing, are finding increasing use. It is also good practice to equip each column of tubing with a tubing catcher which is designed to prevent tubing from falling into the well in case of failure of other supporting mechanism; and a tubing "bleeder", use of which makes it possible to drain the oil from the tubing when the plunger is sanded in the working barrel so that rods and tubing must be pulled together, will also be a useful accessory. Rod hangers are designed to suspend the "stands" of sucker rods vertically in the derrick, at such times as they must be withdrawn from the well, rather than to lay them out horizontally on the ground or on plank flooring where they may accumulate dirt or possibly become bent or otherwise damaged so that points of weakness are developed which may later cause failure.

The string of sucker rods in a pumping well is suspended in the well at its upper end, on a polish rod which operates through a stuffing-box tubing head and which in turn, is suspended from the end of the walking beam over-hanging the well. For a sketch illustrating the general arrangement of power connections at the surface, the reader is referred to Figure 3 of the first article of this series, printed on page 69 of the Oct. 26 issue of NATIONAL PETROLEUM NEWS. For deep-well pumping service, the simple type of connections there illustrated, must be displaced by heavier and more dependable forms. Some type of beam-hanger which provides a secure connection between the upper end of the polish rod and the end of the walking beam, and which adapts itself to the varying position of the beam and still provides a vertical pull on the polish rod, is of immediate practical value. Vertical movement of the polish rod is important in order to avoid wear of packing in the tubing head and vibration of the tubing. Figures 7 and 8 illustrate two types of beam hangers providing substantially vertical polish rod travel and proper security in the power connection for deep-well service.

Polish rod grips of many different forms are available, providing a means of attaching the beam hanging mechanism to the polish rod at any desired point, in order to accurately adjust the range of movement of the pump plunger in the working barrel. Figure 9 illustrates an excellent type of rod grip. The illustration also shows a novel form of spring shock-absorber, designed to relieve the rods to some extent of the destructive jar or "hammer" which results from rapid reversals in direction and rate of movement of the beam, and the inability of the long column of rods to adjust itself to these rapid changes without vibration. A polish-rod clamp for supporting the column of rods on the upper end of the tubing head, is also necessary when the beam-connecting mechanism is disengaged from the rods. This clamp also is illustrated in Fig. 9.

In crooked holes, the sucker rods bear against the inner surface of the tubing, causing rapid wear on the rod joints and cutting grooves in the tubing, an action which eventually results in tubing leakage and parting. Eccentric strain on the rods immediately above the plunger, may also cause unequal wear of the plunger and working barrel. These difficulties can be largely overcome—at any rate, a more uniform distribution of the wear can be brought about—by the use of a rod rotor or a tubing rotator.

Rod rotors are so designed that with each stroke of the beam, the

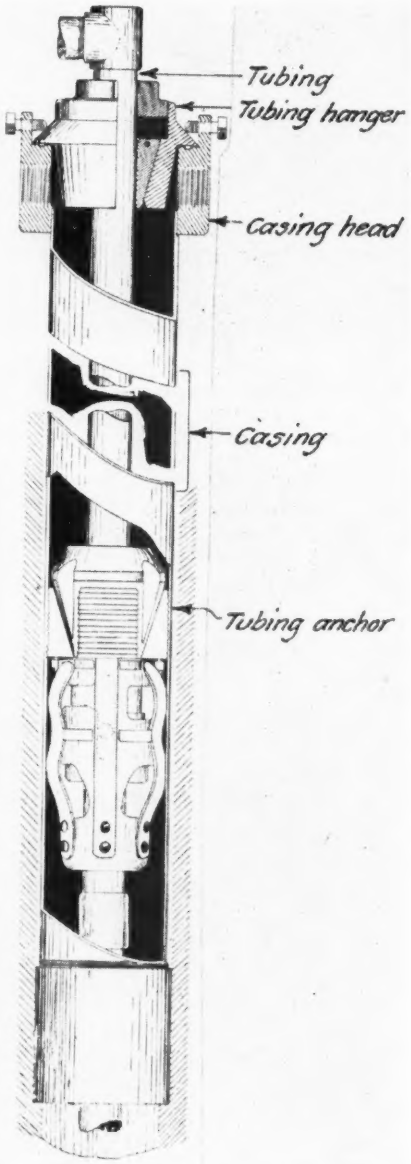

Fig. 12. "Hercules" tubing hanger and anchor. (Courtesy Hercules Tool Co.)

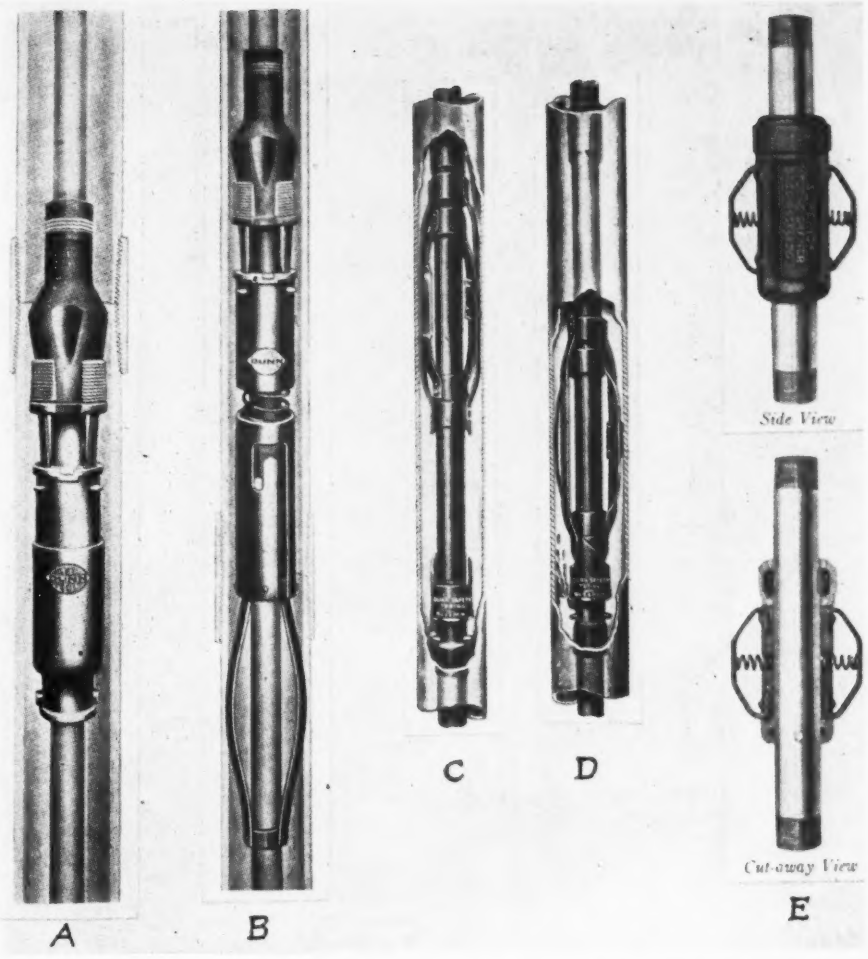

Fig. 13. Dunn tubing catcher. A—without anchor. B—with anchor. (Courtesy Dunn Manufacturing Co.).

Fig. 14. Types of tubing drains. At left—Dunn tubing bleeder; closed (c) and open for drainage (d). E—"Superior" tubing drainer.

entire column of rods, together with the pump plunger, is caused to rotate a fraction of a turn. This is generally accomplished with the aid of a ratchet mechanism, actuated by a fixed rod or chain connection with the walking beam, providing a positive rotating action. The two rod rotors illustrated in Figures 9 and 10 are typical. A simpler type provides for suspension of the rods from the end of the beam on two wire slings, each attached to a separate cross-head, which takes the load of the rods on different portions of the stroke. (See Fig. 11.)

Twisting of the wire cables as the load is alternately applied and released, causes the rods to turn.[10] In addition to better distribution of wear on rods, tubing, plunger and working barrel, due to the fact that the rods are rotated clock-wise, plunger rotors also tend to prevent unscrewing of the rods in the well. It is also claimed that the combined rotating and axial movement of the plunger in the working barrel, possible through their use, permits of a tighter fit between the plunger and barrel than is normally possible.

10. Suverkrop, L., "Plunger Rotors", Summary of Operations, California Oil Fields, Vol. 10, No. 4, October, 1924, pp. 5-9 (Calif. State Mining Bureau).

A device known as a tubing rotator, is also available on the market, having the same general objectives as the rod rotators. In the case of the tubing rotator, however, no automatic mechanism is provided. The tubing is merely suspended in a special type of casing head equipped with a set of tubing slips mounted on ball bearings, which permit of readily turning the tubing a fraction of a turn every day, thus changing the points of contact of the rods on the tubing, and resulting in better distribution of wear than is possible in a fixed tubing and rod installation.

Tubing Hangers, Catchers, Anchors and Drains

Inasmuch as the working barrel of the pump is usually suspended on the tubing some distance above the bottom of the well, it is important that the tubing used in a plunger pumping installation be securely suspended at its upper end, so that there may be no possibility of the column falling to bottom. Such an accident would result in severe damage to the tubing, causing it to bend, buckle, collapse or telescope in the collars, and necessitating difficult and costly repair operations. The usual method of supporting the tubing is to attach a tubing hanger at its upper end, which rests on or engages some part of the casing head. Inasmuch as the weight of the column of tubing often aggregates several tons, the supporting devices employed at the casing head must obviously be of substantial character. Figure 12 illustrates a satisfactory type of hanger, in which the tubing is supported on slips built into a substantial steel housing which is clamped in the upper end of the casing head.

The column of tubing sometimes parts by unscrewing in a collar, as a result of continual vibration, or by failure due to fatigue, excessive stress or improperly made-up or otherwise defective joints. In order that the lower end of the parted column of tubing may not fall to the bottom of the well in such an event, it is a good precautionary measure to insert a tubing catcher in the string near its lower end. The same device,

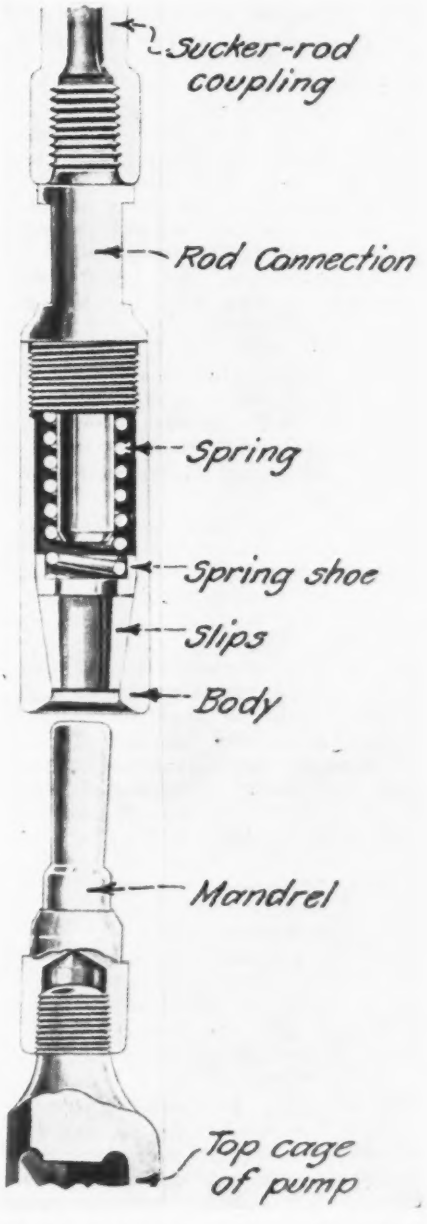

Fig. 15. Device for attaching sucker rods to pump plunger (Courtesy Axelson Machine Co.)

or a very similar one, may be used to anchor the tubing to the casing near its lower end, so that it may not move up and down in response to the stress developed by the operation of the pump—an action which is detrimental to the tubing joints and results in wear on the tubing collars and casing.

Figures 12 and 13 illustrate typical tubing catchers and anchors. They function by the operation of a set of slips which engage the casing when the tubing descends. In the case of the tubing anchor, the slips are so designed that the tubing may move neither up nor down with respect to the casing. The slips may be set by turning the tubing after it has reached its proper depth, and released when necessary to raise or lower the tubing at any subsequent time, by the same means.

WHEN the tubing and rods must be withdrawn from the well simultaneously, as may happen when the plunger becomes frozen in the working barrel by sand accumulation or otherwise, it is convenient to have a means of draining the accumulated oil in the tubing. For this purpose, a tubing drain or bleeder may be inserted in the string of tubing just above the working barrel. (See Fig. 14.) This consists of a double-tube device, the inner tube being free to turn with the tubing, while the latter remains stationary due to the pressure of a pair of springs against the casing. Two holes, one in the side of each tube, may be brought opposite each other by turning the tubing, thus permitting the oil within to flow out into the casing.

Another useful device is one designed to be attached to the lower end of a column of sucker rods, which automatically grips a mandrel on the upper end of the working valve cage. (See Fig. 15.) Such a device permits of placing the plunger in the working barrel at the surface, and lowering both together on the tubing. After the working barrel and plunger are in position, the column of rods is assembled and lowered, and the attachment described makes and maintains a positive connection with the upper end of the plunger. The earlier practice of lowering the plunger on the rods, may result in considerable scoring and abrasion of its polished outer surface, by contact with the inner walls of the tubing. Some of the special types of pumps, such as insert pumps,[11] make the use of a device of this character obligatory.

The necessity for avoiding bends, dents and scratches in or on the sucker rods, which may later be centers of weakness, leading to failure under fatigue, has been mentioned in a previous section. It has been common practice in years past, and still is on many producing properties, to uncouple the rods in stands and lay them horizontally on the ground or plank flooring along the side of the belt house, when they must be withdrawn from the well. In order to avoid the damage to the rods which may result in this practice, and to keep them relatively free from sand, dirt and foreign solids which tend to adhere to them, many operators now make use of rod hangers, which permit of suspending the rod stands in a vertical position in the derrick. Figure 16 illustrates a typical rod hanger, the device being suspended up in the derrick so that when the rod clamps are attached near the upper end of a stand of rods, the lower end will swing free of the derrick floor. Important considerations in the selection of a rod-hanging device, are security against dropping of rods, and ease of manipulation.

11. For a description of insert pumps, see the previous article of this series, printed in the Dec. 7 issue of NATIONAL PETROLEUM NEWS, pp. 93-94.

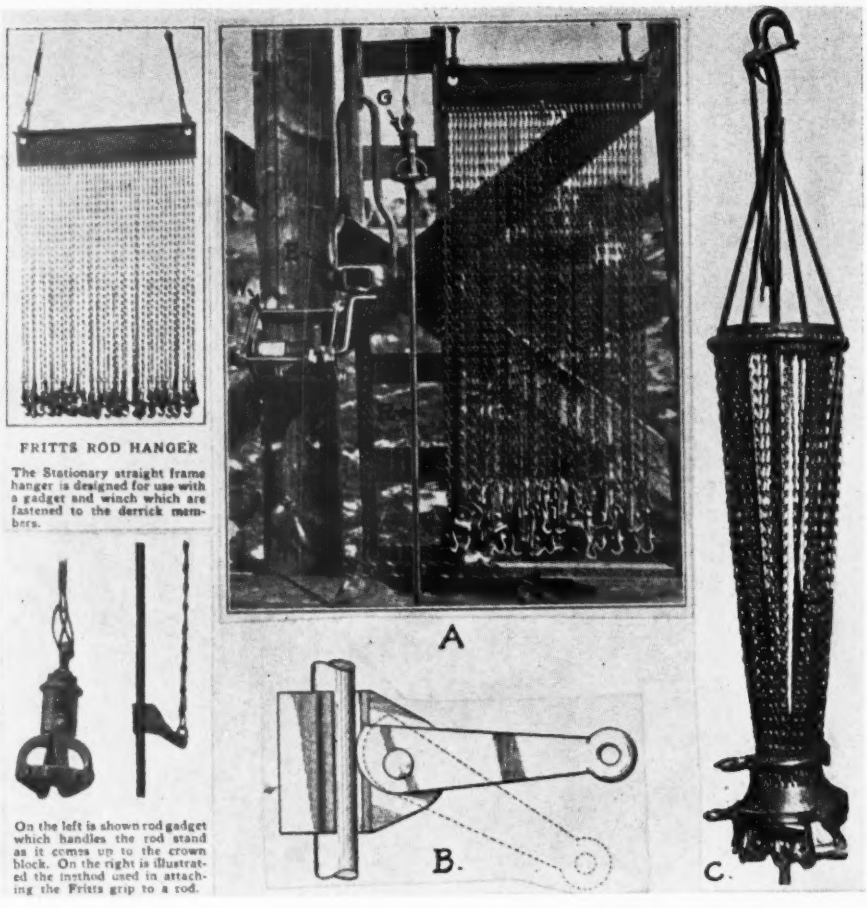
FRITTS ROD HANGER
The Stationary straight frame hanger is designed for use with a gadget and winch which are fastened to the derrick members.
On the left is shown rod gadget which handles the rod stand as it comes up to the crown block. On the right is illustrated the method used in attaching the Fritts grip to a rod.
G
A
B.
C.

Fig. 16. Fritts rod hanger (Courtesy Fritts Mfg. Co.). A—photograph of straight-frame hanger in derrick, showing winch W, for lifting rod out of elevator E. R—sucker rod supported by gadget G. B—detail of rod grip. C—portable type of hanger.

R. J. White of the general office producing organization of the Louisiana Oil Refining Corp., Shreveport, has been temporarily transferred to the Allen, Okla., district field office. Aside from the Allen district the Louisiana company is not operating any drilling rigs at present.

Hoagland Heads I.O.M.A Refinery Sales

CLEVELAND, Jan. 3.—J. S. Hoagland has been placed in charge of the refinery sales department of the Independent Oil Men of America, 624 S. Michigan Ave., Chicago. At one time Mr. Hoagland was with the Union Petroleum Co. and later the Sinclair Refining Co. which bought the Union.

L. V. Nicholas, president of the I.O.M.A., announced that four refineries have subscribed funds necessary to maintain the department. They are Vickers Petroleum Co., Kanotex Refining Co., Omar Refining Co., and Panhandle Refining Co. Several hundred tank cars will bear the emblem of the organization, the spread red eagle.

New Jersey Oil Trade To Banquet

NEWARK, N. J. Jan. 3.—The second annual banquet of the New Jersey Oil Trade Association will be held on the evening of Jan. 18 at the Washington restaurant here. William L. Dill, commissioner, and other speakers, plus snappy music and entertainment, are some of the features promised for the banquet.

Natural Gasoline Must Find Wider Use And Plants Run More Efficiently

By George A. Burrell* and R. P. Mase*

APPARENTLY the natural gasoline industry still has ahead of it a protracted period of low prices. Oil production now has an influence on prices not felt in earlier days, for at present as soon as a new oil field is opened a host of gasoline plants immediately spring up.

Further, refiners now fill much of their need by extracting gasoline from their refinery vapors, and cracking plants make a low i.b.p. gasoline that on the whole does not need as much natural gasoline as does straight run gasoline to give it the desired volatility.

Hence, natural gasoline plants must do two things to keep their plant operations on the black side of the ledger. They must sell the widest range of natural gas condensates possible, that is, they must find a market for a wider range of products than heretofore marketed so as to increase their production and cut their cost per gallon, and they must also operate their plants at peak efficiency.

New uses of natural gas and natural gasoline are ahead but in general they will come slowly as far as affecting the industry at large is concerned. Brown's work has increased the use of natural gasoline for motor fuel, but the refiner and blender (jobber) will demand a stable fuel if they are to use anything like the proportion of gasoline the natural gasoline industry hopes for, and then only in the winter time. The more stable the gasoline sold the lower the plant yield.

Further, while natural gasoline is a fair antiknock fuel, its great usefulness in motor fuels will always be because of its volatility. If the refining industry turns to vapor phase cracking to any extent the use of natural gasoline as a blending agent will decrease, not only because vapor phase cracked gasoline is a splendid antiknock fuel but mainly because the gasoline thus produced will be much more volatile than present cracked gasoline. But there is more talk than action about vapor phase cracking. It is an expensive way to make gasoline. This question is wrapped up with the future of antiknock fuels and the lengths the refiner will have to go to produce these fuels, in competition, say with Ethyl gasoline.

Some jobbers in marketing antiknock fuels have entirely overlooked the always important question of volatility. Different Ethyl gasolines have suffered in this respect in the past, so that in many localities a motorist had an antiknock fuel when he would much rather have had a more volatile fuel, except possibly he felt that he was in the swim and abreast of the latest wrinkle. Now most dispensers of gasoline appreciate that while an antiknock fuel is demanded they must not at the same time overlook the question of volatility.

Special cuts of natural gasoline make good airplane fuel. These are simply highly stabilized cuts from good rectifying columns. The light fractions have been discarded in large measure. Anybody can make these fractions but there is only a limited demand for them. The airplane industry is too young. A plant sacrifices yield in making them but obtains a somewhat higher price. But considerable sales effort must be expended to secure this business of which only a limited amount is available.

Straight run high test high gravity motor fuels for automobiles can also be made but here again plant yields go away down. Further, these volatile motor grades bring little more return than ordinary gasoline, in tank car lots.

The natural gasoline manufacturer can increase his return by dispensing his product through a line of service station, mixing his product in as large amount possible (50 per cent in cold weather) with less volatile gasoline, but the service station business is overcrowded and ample capital is required to get into the business.

THERE is a small outlet at the present time for light gasoline fractions of natural gasoline, the propane-butane cut or some part of it. It is used in communities where gas is not available. The idea is sound in that the gasoline is sold at a price that many householders are willing to pay and which leaves a profit for the gasoline plant operator. At the present time almost all of it is sold for use in domestic cooking stoves. The authors have been selling this stove gasoline for some years.

A distributor of this gasoline must have a source of supply, the necessary cylinders and stoves and distributing centers in charge of various

*Burrell-Mase Engineering Co., Pittsburgh.

Sizing Up the Natural Gasoline Industry

The authors of the accompanying article find:

That Dr. Brown's work has promoted use of natural gasoline as motor fuel but a stable product is demanded which cuts down plant yields. If vapor phase cracking becomes widespread use of natural gasoline as fuel will diminish.

* * *

That natural gasoline is a good airplane fuel but market is limited.

* * *

That some natural gasoline manufacturers can increase their return by going into the retail business, mixing the straight gasoline with percentages up to 50 per cent of natural gasoline. This, however, takes considerable capital.

* * *

That there is now a small outlet for the propane-butane fractions for use as household fuel and this field shows promise of developing further. Use of propane-butane as a substitute for gas oil in enriching water gas does not look so promising.

* * *

That use of the lighter fractions as refrigerants in competition with ammonia, sulfur dioxide and carbon dioxide shows some promise.

* * *

That manufacture of chemical by-products is progressing. Glycols and amyl alcohol and amyl acetate are leading products being developed from wild natural gasoline fractions.

* * *

That the industry probably has little to fear from patents in developing the absorber, still, fractionating column, heat exchanger, oil cooler, condenser and the like.

* * *

That much can be done right now to help the natural gasoline industry by making a thorough survey of all plants and bringing their operations up to the highest possible efficiency.

agents, and through these agents the ultimate consumers. Most of the distribution will first take place in the east but will spread to other places.

As time goes on and the field is developed the price of the gasoline at the natural gasoline plants may fall to a point where not much profit per gallon will be made but this will take some years. It simply depends on how fast the larger natural gasoline companies get into the business and particularly on how much they cut prices to get the business. This stove gas business is sound and will develop fairly rapidly.

Quite a field has opened up for still lighter gases (largely ethane say) for cutting purposes. This is a field still largely undeveloped but a sound one. Acetylene and hydrogen are the two competing fuels and of course, as liquefied natural gas enters the market in quantity, the prices of these fuels will be cut to strangle competition if possible.

Even so, cutting gas prices can remain at a level which will yield a profit if the natural gasoline industry wills it. As far as the distributing end is concerned, this business, like the stove gas business, requires ample capital and merchandizing experience.

THE use of butane say, as a gas oil substitute in carburetting coal gas is being proposed by at least one large natural gasoline manufacturer. Just how far this will go in helping increase gasoline plant profit is difficult to say. Possibly not very far. It has to compete with gas oil (cracked to make the gas) and it probably equals gas oil, gallon for gallon, as far as its utility is concerned. Gas oil now sells for 3 cents per gallon, Oklahoma. There is no more profit in making this gas oil substitute at 3 cents a gallon than there is in making grade A gasoline at the same price except as one increases plant production and thus cuts operating costs.

The light fractions of gasoline have been proposed for refrigerating purposes, as against ammonia, sulfur dioxide and carbon dioxide, which are used at the present time, principally the former two gases. The explosiveness of natural gas condensate is against this use, otherwise the material can well compete on a price basis.

As far as chemical by-products from natural gas are concerned, the Carbide & Carbon Chemical Corp. is the principal firm which makes these products on any appreciable scale. Glycols are the leaders at the moment. That company threw its huge resources and adequate talent into the problem and is building up a big business by cracking natural gas, largely tail gas, from gasoline plants of the United Fuel Gas Co., Charleston, W. Va. and then turning these cracked compounds into marketable substances. Another company makes amyl acetate (through amyl alcohol) at a plant near Charleston, W. Va. but it has not met with great success.

One of the authors has successfully made amyl acetate straight from the chloride by esterification with sodium acetate under pressure and in the presence of activated charcoal.

This chemical by-product field is still largely untilled but there are probably few natural gasoline companies that would care to undertake a like program. For this kind of work there is generally demanded an organization of resources and broad vision in research matters like the Carbide Co., the Dupont Co., The General Electric Co., the General Motors Co. and the like.

FUNDS and talent are required in mass attack. The natural gasoline industry could foster such a program possibly in joint attack by the whole industry but for the first two or three years results would be slow even at best. However, it is altogether likely that one or more of the larger natural gasoline producers, may as the result of intensive research, initiate a program that will bring them more profitable markets than the rest of the industry may enjoy.

So far, we have briefly reviewed the outlook for increasing production by sale of a wider range of products. The average plant can probably help itself to a temporary advantage at least more quickly by a thorough going over of its equipment with a view to increasing production efficiency and decreasing production cost.

To the authors' mind there is nothing secretive or withheld from the average plant by patent protection, that is when we come to consider the newer type of absorber, still, fractionating columns, heat exchangers, oil coolers, condensers, power plant devices and the like. The stabilizer (i.e. fractionating column) is still in dispute although a Texas federal court has handed down an opinion favorable to the industry.

Great improvement has been made in equipment and operating practice over the past several years. Particularly is this true of oil absorption equipment and practice. We will now consider a number of these improvements.

Absorption Towers

IN MOST modern oil plant installations some form of bubble tower is used, it having been demonstrated years ago that the most efficient means of bringing a gas and a liquid in contact is this kind of a tower. The natural gas industry, like the refining industry in the case of fractionating towers, was slow in adopting them, although their use goes back many years. Witness the Coffey still of 1832, the Rogers tower of 1872 and the Frasch still of 1896 and many others.

A bubble absorption tower in the main accomplishes with a smaller investment what a taller plate or packed tower will do. In practice a packed tower 60 feet tall will not scrub the gas as cleanly as a bubble tower 30 or 35 feet tall. The result is that while a packed column could be built tall enough to scrub the gas practically free of gasoline, it almost never is done, while bubble towers can be built in convenient heights which will remove the gasoline so well that only a few gallons per million remain.

Residue gas from a packed tower installation will seldom show a lower gasoline content than 30 gallons, and more often from 60 to 120 per million. A content of gasoline of 5 gallons per million is attainable with the best bubble towers. The gasoline in the gas and that in the oil more nearly approach equilibrium in a bubble tower while it requires an impossible investment to reach the same condition of equilibrium in packed towers, speaking of commercial sized towers of course.

The authors have found that velocities through a bubble tower may be maintained at 75 feet per minute at atmospheric pressure and 40 feet per minute when the pressure is 300 pounds gauge. Other velocities may be accepted as lying on a straight line between these two points. This curve should determine peak loads velocity so that average working velocities are below this.

The number of plates or decks to use in a bubble tower absorber is a matter of experience. There is no way of calculating it except from experience with operating towers. The authors use a bubble absorption tower that brings about five series contacts on each plate instead of one as is the case with the ordinary tower. Therefore, a smaller number of decks may be used.

However, we advocate 15 to 18 even so, cognizant of the fact that some designers use fewer plates of the ordinary type. We believe that a few extra plates will pay for themselves many times over in fuel saved because an equilibrium condition is more nearly approached. This means that less oil is circulated to strip the gas. Less oil circulated means less fuel burned. Provision must be made for draining the decks of water and for keeping the gas from flowing up the downcomer pipes.

Steam Still and Heat Exchangers

BUBBLE towers have come into favor for stills as well as for absorbers. The reason is essentially the same. Better contact means more efficient stripping and smaller steam consumption. Steam consumption in stills surprisingly near the theoretical requirement can be obtained by a

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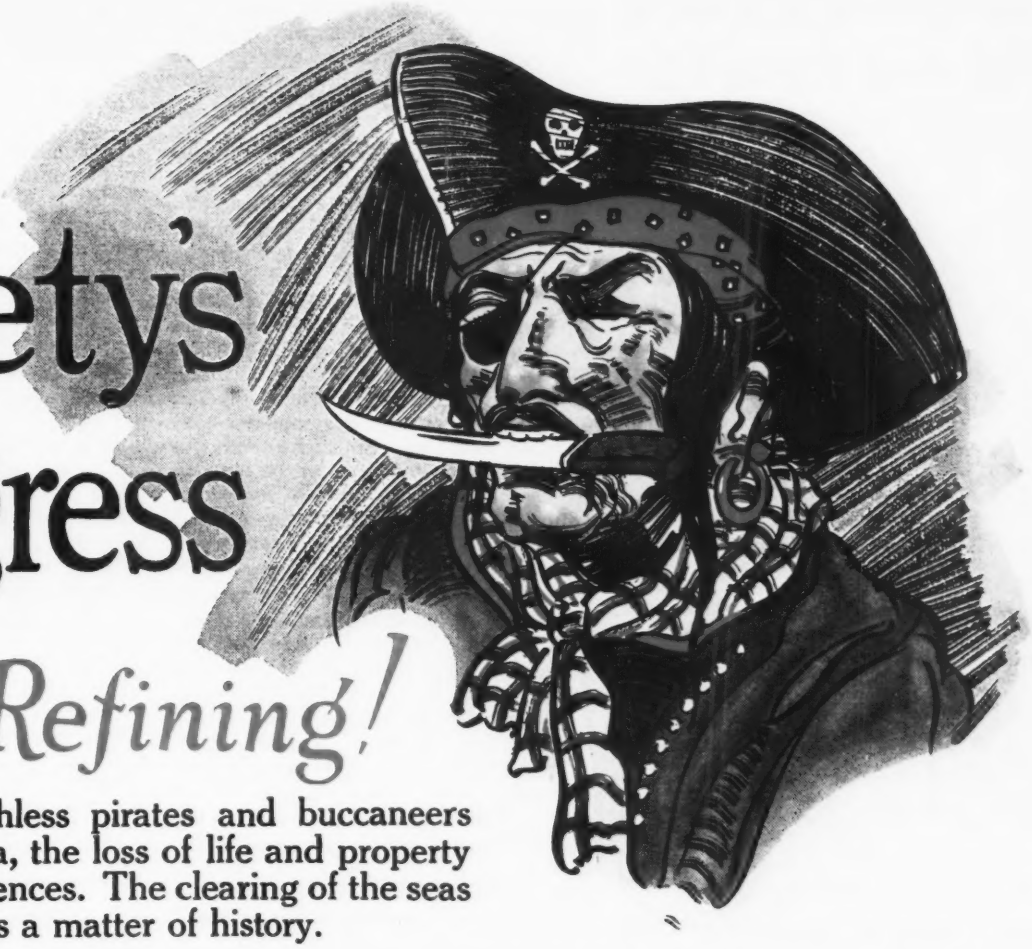

WHEN the ruthless pirates and buccaneers ruled the sea, the loss of life and property were daily occurrences. The clearing of the seas of these wasters is a matter of history.

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properly regulated bubble tower still. Oil stripping is practically perfect, i.e., the gasoline vapor pressure of the oil leaving the still is negligible. This is essential.

The old type of still where the steam was blown through the body of oil is inefficient. The steam goes through the oil in large bubbles and much of it, that in the interior of the bubbles, misses contact with the oil. Present types of bubble tower stills are much more efficient. The authors use one of the same construction as their bubble tower absorber, five series contacts on each plate. Exhaust steam is used exclusively for ordinary operation. For unusual conditions when an emulsion tends to form, tight live steam may be used to raise the oil temperature anywhere from 250 degrees to 300 degrees Fahr. as required. The exhaust from these coils is put through the open bubble tower part of the still.

A fair way of estimating steam consumption is to provide enough to heat the oil 50 degrees Fahr. with 50 per cent excess to evaporate the gasoline, sweep the still and take care of heat losses.

One can assume that the oil temperature leaving the absorber is 70 degrees Fahr. and the average distillation temperature 220 degrees Fahr. The total heating range is 220-70= 150 degrees Fahr. If one assumes a heat recovery in the heat exchanger of 66-2/3 per cent the oil will enter the still at 170 degrees Fahr. This disregards heat used in the exchanger to heat and evaporate the gasoline and dissolved gas. However, 170 degrees Fahr. heat exchanger outlet temperature of charged oil is easily obtained in practice. Seventy to 80 per cent heat exchanger efficiency can be had without exorbitant first cost of the exchanger.

If a double pipe exchanger is installed a K of 30-35 can be used for calculation purposes. This is the amount of heat (B.t.u.) transferred per degree mean temperature difference per hour per square foot of heating surface. A 2-inch pipe inside a 3-inch one makes a good combination. Velocity should be nominally kept at about 120 feet per minute, although in operation this will have to be varied to meet the requirements. The total square feet of surface required based on outside surface of inside pipe can be determined as follows:

$$\text{Sqr. ft. required} = \frac{\text{(B. T. U. per hour to be recovered)}}{\text{(K or transfer rate) X (Mean temperature difference)}}$$

It will be seen that the B.t.u. per hour to be recovered is determined by the amount of oil, and efficiency desired. K, the transfer rate, is an experimentally determined constant. The mean temperature difference is the logarithmic mean temperature difference between the oil on the two sides of exchanger wall. For most estimating purposes the arithmetic mean may be used.

Calculations embracing film coefficients have been proposed but they are scarcely in shape at present for routine practical use, although they give promise in the not too distant future of reducing present empirical calculations to ones where absolute data can be used. But even then liberal allowance will have to be made for fouling of the exchanger, as much as 50 per cent. In many gasoline plants today fuel requirements are heavy because the exchangers are not kept clean.

Back pressures of 15 to 20 pounds per square inch are encountered with 2-inch in 3-inch double pipe exchangers at 120 feet per minimum velocity. Shell and tube heat exchangers are very satisfactory, particularly because they can be readily taken apart and cleaned and particularly because of their low back pressure or resistance. This allows the hot oil pumps to be placed on the exchanger stripped oil outlet. The pump will thus handle oil of about 120 degrees Fahr. temperature instead of at 220 degrees Fahr. The advantage is obvious. K in the case of shell and tube exchangers in gasoline plant practice may be as high as 70-75 B.t.u.

Oil Cooling Coils

K FOR oil cooling coils is variously found to range from 8 to 45 B.t.u. The divergence is due to different velocities, sizes of pipes, their arrangement, etc. Using 2-inch coils and a velocity of 120 feet per minute, a K of 30 is a fair value to use. This assumes that the pipes will be kept clean and that sufficient open spray water will be supplied. Several factory built types of oil coolers are now on the market, some of which are proving very satisfactory in service.

The amount of water to use on the oil cooling coils can be estimated on the basis of B.t.u. to be extracted by heating water through a range of 10 degrees Fahr. The actual heating range is about 5 degrees Fahr., due to the cooling effect of that portion of the water evaporated from the coil surface.

A supply of water of about 2½ gallons for each gallon of oil circulated should be ample for both the oil cooling coils and the coils of the tail gas compressor (recompressor).

Condensing Surface

CONDENSER surface can be figured as one foot of 2-inch pipe for each 5 or 6 gallons of gasoline condensed per day, or one square foot of surface for each 10 gallons of gasoline produced per day. The knock-out box usually has enough water thrown in direct contact with the steam and gasoline vapors to cool them to 180 degrees Fahr. The amount needed will depend upon the

amount of steam leaving the still.

Total Plant Steam Consumption

THE total amount of steam required will vary and will depend upon whether the compressors are gas or steam driven, whether the oil pumps are direct steam pumps or steam engine driven pumps, the type of still, the saturation of the gasoline in the oil, and the general efficiency of the power plant. Usually the steam required to pump the oil and water is just about sufficient to run the still, so that if the compressors are gas engine driven and if the pumps are in good shape one can figure on an amount of steam that is twice that required to heat the oil 50 degrees Fahr. This allows for general plant heat losses. Of course, each plant with its own conditions has its own problem of fuel economy. An attempt should always be made to balance the prime movers, i.e., pumps compressors, etc. so that enough exhaust steam is available to operate the still, heat the feed water, heat the plant and take care of weathering. If by using all steam drives, too much exhaust steam becomes available, such part as is necessary should be installed as gas engine drive. In this way maximum fuel economy can be approached.

Saturation of Oil with Gasoline

SATURATION of gasoline in oil may vary from less than 1 per cent for low pressure lean gas up to 15 per cent for high pressure rich gas. From much experience the authors find that the empirical formula

(gal. per million gasoline content) x (absolute pressure in pounds) ÷ 12500

equals the per cent saturation that may be expected with good absorbers and oil at 60-70 degrees Fahr. (i.e., per cent based on oil only as 100 per cent and by volume).

Oil to be circulated per 1000 cubic feet of gas may be determined by dividing absolute gas pressure in pounds into 1250. Percentage saturation is directly proportional to the gasoline content and absolute pressure. Oil to circulate per 1000 feet of gas is inversely proportional to absolute pressure and independent of gasoline content.

We are assuming a good grade of absorption oil and grade AA gasoline. If equilibrium is reached the saturation must be such that the vapor pressure of the gasoline in the oil at absorber oil outlet just equals the partial pressure of gasoline in the gas.

Type of Pumps

THE authors advocate steam engine driven, governor controlled pumps for the oil to the absorbers instead of the ordinary direct steam pump. In this way the oil rate can be better controlled and steam consumption per pump is cut in half. If the pump speed is not governor controlled the oil rate may vary over a wide range from the rates that should be maintained. The loss in gasoline is obvious.

Fractionating Columns

THE application of efficient fractionating or stabilizing columns, better called rectifying columns, is of recent adaption to the natural gasoline industry, but great numbers of them have been in constant use in other industries for scores of years. The requisites of good column operation are:

(1) The still. This should be large enough to afford disengaging space for the vapors from the heavier liquids.

(2) The column. This should be of such diameter as to provide for the proper velocity (superficial) of the vapors through the column.

A maximum velocity of 60 feet per minute may be used but much lower velocities are commonly employed. If the velocity is too high liquid is thrown out of the top of the column. If it is too low, especially in a bubble tower, good contact is not provided between descending liquid and rising vapor in the column.

The height of the column is a matter of experiment. It cannot be calculated. Column calculations can be made on binary mixtures but not on complex mixtures like natural gasoline or petroleum fractions. A column to handle 5,000 gallons of gasoline per day will require a height of about 30 feet and a diameter of about 3 feet.

For small gasoline plants there is little to be gained by using the bubble type column. Intimate contact is provided with fillings like Raschig rings or other efficient forms of packing. A packed tower can be built greatly oversize for so small an amount that the advantage of a bubble tower is not distinct. However, where the tower diameter is great and channeling would occur, the bubble tower is distinctly advantageous.

Temperatures and pressures in the column and still will depend upon the grade of gasoline being made and the type of gasoline plant. At most plants a cut is made so that part of the butane and all the heavier hydrocarbons are thrown into the merchantable gasoline and the rest of the butane and lighter gases are discarded out of the top of the column. Such a temperature is carried in the still so as to boil all of the overhead constituents and part of the commercial fractions out of the still and force them into the column. The top temperature must then be such as to reflux back a considerable part of the overhead cut. The column performs its function of sharply separating the desirable still gasoline and the volatile overhead portion.

The temperatures required will depend upon the pressures used. In ordinary oil absorption plant practice pressures in the still are of the order of 5-25 pounds per square inch, temperatures in the still are of the order of 70-120 degrees Fahr. and those in the top of the column about 1-15 to 1-35 degrees Fahr. One simply sets the column to give the desired product. Low temperatures at the top of column are produced by expanding into the column the high and low stage condensates. This expansion (Joule-Thompson effect) causes a lowering of the temperature.

In compression plant practice the entire product, direct from the compressors can be thrown into the rectifying column. A cooling coil at the top of the column takes the place of the condenser coils. For pressures of about 250 pounds per square inch the temperature at the top of the column will be of the order of 120-125 degrees Fahr. and that at the base 250-300 degrees Fahr. However, customary practice is to condense a wild product and fractionate same in a column. Not so much work is demanded of the column in this event because the gases have been largely separated.

IF one desires to cut pure ethane out of residual gases of a gasoline plant two additional towers are needed. The second one is a high pressure column, and takes overhead gas from the gasoline column. In this high pressure column the ethane and methane are thrown overhead and the propane and remaining butane are discharged from the base. This latter makes a good stove gas. Next the methane and ethane are separated in another column, the methane going overhead and the ethane remaining as a base liquid. Appropriate temperatures and pressures have to be used. Any cut or combination of cuts can be made. Additional compressors are required in conjunction with these towers.

Recycling

IT IS possible to get fair fractionation (stabilization) in an absorption plant by another means. If the plant has been built considerably oversize and the gasoline is continuously weathered to shipable specifications as produced, and the overhead vapors put back into the plant inlet, the plant efficiency as a whole can be made to very nearly equal that produced with a good fractionating column.

Successful recycling is contingent on a good absorber, considerably oversize, and in fact oversize equipment throughout, so that large volume of light ends can be circulated around repeatedly. Even in a plant equipped with a fractionating column, all gaso-

line bearing gases and vapors, i.e., vent gas, tail gas accumulator discharge vapors, and tower gases should be thrown back into the plant inlet.

It is necessary to put back recycle vapors into the plant inlet which have a greater gasoline content than that of the discharge gas from the absorber, although it is not necessary that the recycle vapor gasoline content should be as great or greater than the fresh incoming gas. This is based on the principle that the absorber will reduce the gas leaving it to a practically constant gasoline content, which is determined by absorber efficiency and residual gasoline vapor pressure of the oil.

The general theory simply stated, underlying recycling as a rectifying agency, is that as the wilder fractions are thrown back into the plant often enough, a little of the nonsalable portion escapes each time so that eventually the salable portion is separated from the nonsalable or wild fraction.

Vent Tank

THE vent tank is an old established piece of oil plant equipment. Even so, there are still a few old oil plants not so equipped. As much fixed gas as will leave the oil when the pressure is relieved when the oil leaves the absorber should be vented back to the plant inlet. The vent gas carries some gasoline and therefore should be recycled. On the other hand, it contains so large a proportion of fixed gas that if it is allowed to pass through the still, condenser and tail gas compressor it interferes with condensation and cuts down the yield.

If it is necessary to compress the vent gas to get it back into the plant inlet, a separate compressor should be provided. It should not be mixed with tail gas or tower gas. Pressure on the vent tank should be held between zero and 5 pounds gauge pressure as a general rule. The oil should not be heated before entering or while in the vent tank. Sufficient oil storage capacity should be provided in this tank itself to hold twice the oil capacity of the absorber when the latter is a bubble tower type.

Oil plants working against a gas pressure of 250 lbs. or over, should vent in two stages.

Water Drips

WATER drips should be provided on the oil circuit on the stripped oil side at the outlet of the heat exchangers and also at the outlet of the oil cooler. The latter is the more important of the two.

Cooling Towers

IT IS the belief of the authors that water cooling towers are not used enough, especially in the east. Three direct benefits accrue. First, cooler water which means more production. Second, less water is used because about 95 per cent of the water is recirculated and only 5 per cent makeup water is used. Third, cleaner water results because only about 5 per cent makeup water is used.

Cooler water means lower temperature oil entering the absorber and lower condenser temperature. Also cooler gas enters the absorber. The authors installed a plant in Pennsylvania recently which now has oil of 78-80 degrees Fahr. on days when the atmospheric temperature is 94 degrees Fahr. in the shade. We believe that some plants lose as much as 30 per cent of their summer production because of lack of cool water.

Recirculating 95 per cent of the water means that a plant which requires 1,000 gallons per minute of cooling water "once used" can run on 50 gallons per minute of water during a dry spell.

Recirculating 95 per cent of the water also means less dirt and scale on the cooling coils, on condensing coils and in gas cooling jackets and less scale in compressor jackets. This means lower upkeep and higher efficiency.

A 1,000 gallon per minute tower can be installed for $6,000 to $8,000.

Gas Testing

METHODS of testing the gas for gasoline content still leave something to be desired. The charcoal method is generally used but concordant results by different testers are by no means attained. A standard test has been prescribed by the National Gas Association of America. This test calls for the condensation at 32 degrees Fahr. (cracked ice and water) of the gasoline on glycerine distillation and also keeping the receiver in an ice bath, but not treating the non-condensible vapors in any way. All efficient plants even making grade AA gasoline can exceed this test. Even so, makers of equipment have advertised that they can exceed this standard test by 10-25 per cent or more. Many efficient plants making grade BB or C gasoline say can exceed it by 50-80 per cent. It is a well established fact that the charcoal testing method is relatively more efficient on lean gas than on rich gas.

Because plants exceed in their output this standard test, various testers use modifications of the standard method. Some absorb the tail gas from their glycerine distillation outfits in naphtha; some operate the distillation under pressure and some absorb the tail gas gasoline in charcoal and finally throw this charcoal into the glycerine flask. However, the important point is to reconcile the test with the grade of gasoline commercially produced, assuming that the plant is efficient. It is the authors' opinion that the standard test can be used and the results multiplied by a factor to bring the test results up to grade of material being produced. Factors will differ for different plants and must be determined for each plant.

Some of the larger companies have adopted low temperature fractionation and pressure rectification in their laboratory work to help control the operation of their commercial plants. With this means one can make any cut desired and sharply determine any component in the gas or gasoline up to the hexane cut say, which is all that is necessary. Boiling points of the hexane and higher fractions are so close together that the work of separating them is exceedingly tedious. Usually only the propane and butane are determined.

An outfit simple to install for determining the propane and butane in natural gasoline simply consists of a 5 gallon still and say a 5 foot column 2 inches in diameter packed with glass tubes. The whole apparatus, receiver and all, is operated under pressure and with suitable temperatures at the top and bottom. In this way one can keep a close tab on the amount of the wild constituents present in the commercial gasoline and closely follow the behavior of the plant fractionating column.

For determining the gasoline content of gas with laboratory fractional distillation apparatus, one must employ low temperatures. If one cuts out butane and higher at atmospheric pressure a temperature of about minus 120 degrees Fahr. must be employed in the still. At this temperature all of the propane, ethane and methane can be pulled off leaving the butane and higher hydrocarbons behind in the still, for their vapor pressures at this temperature are low. However, the mixtures must be refractionated to get pure fractions. A liquid air submerged receiving flask acts as a good pump to pull off the fractions.

The Charcoal Process

OIL ABSORPTION and compression plants have been so improved that charcoal plants do not enjoy the superiority they once possessed. Charcoal per se is more selective in making a stabilized gasoline than oil or compression methods. But now all one has to do is to circulate such an amount of oil or such a pressure as to condense both tame and wild gasoline constituents and then make a sharp separation between them in a rectifying column. Yields are the same so that the question is simply one of cost of installation and of operation.

About these matters there is a difference of opinion. The charcoal process enjoys an advantage of course at very low pressures because charcoal is an equally good absorbant at high or low pressures. On the other hand, bad corrosive gases or oil spray in the gas run maintenance costs up. A charcoal plant is more complicated in operation than an oil or compression plant.

Gerstenberger Replies to Point Raised by a Critic

"I NOTE the second article on page 48, in the Nov. 9 issue of NATIONAL PETROLEUM NEWS, (writes D. F. Gerstenberger) and am glad to know that these articles have started some real consideration regarding points which heretofore have undoubtedly been passed over or have been omitted from the line of daily refinery thought because it is so often felt that only men of chemical knowledge can really answer these problems and questions with any assurance of correctness.

"To be sure, the correct answer is based on the chemical composition of the oil being handled, and yet we have within our means, methods of determining such factors without the aid of chemistry or a real understanding of the organic structure of various petroleum products.

"In answer to the point raised pertaining to the boiling range and initial boiling point of the feed stock to the cracking stills, having a direct bearing on the yield of gasoline obtainable from such a stock, I can only quote the results obtained from running over a period of time, different grades of gas oil with varying initial boiling points and boiling ranges. Such gas oils were all run under the same conditions, that is pressure and quantity of oil, and the stills handled so that the same length of running hours would produce an amount of coke not detrimental to the equipment, but yet sufficient to indicate that the cracking was taken as far as was possible to a practical way.

"In other words the results obtained were comparable. The cracking temperatures were naturally different on the different grades of stock, for as we all know, there is no set rule for the temperature required for cracking stocks from different sources.

"I am quoting below the results obtained.

Stock	Gravity	Gasoline Yield, per cent	Refined Oil, per cent	Per Cent off at 500° F.	Per Cent off at 600° F.
1.	33.2	44.2	13.5	5.8	36.0
2.	36.6	40.2	13.0	6.9	41.8
3.	32.8	36.4	16.2	7.0	51.5
4.	31.2	35.9	15.3	14.2	54.0
5.	34.5	33.6	17.4	18.2	68.0
6.	31.0	28.0	21.5	22.0	72.0
7.	29.3	24.0	19.3	25.5	76.4

"IT CAN readily be seen from the above that under comparable conditions that the gasoline yield is inversely proportional to the increase in percentage by distillation at either 500 or 600 degrees or any other temperature, I would say, from 450 degrees up as may seem desirable. The fact that coking occurs in a certain operation if oils of high boiling ranges are used, indicates a possible error in the method of operation, rather than in the stock used, for the principle of cracking is the same today as it has been yesterday, and it would seem to me that it is clearly demonstrated by the above facts.

"The gas oils shown in the table came from various sources, but their physical characteristics in relation to their cracking value is plainly shown.

"Regarding the statement that gasoline from cracking residue is invariably of a lower gravity than that obtained from cracking gas oil, I note the correspondent, who has not given his name, states that in his opinion the gasoline obtained from cracking gas oil and fuel oil of the same intermediate boiling points would be about the same gravity.

"It is seldom that we have gas oil which has the same intermediate boiling ranges as fuel oil. If such is the case, he must have in mind a light fuel oil, a great deal of which is really nothing but heavy gas oil, and is marketed or handled in the refinery under the name of fuel oil.

"Even then if both gas oil and fuel oil are virgin products and come from distillation of the same crude, where little if any cracking takes place, the boiling ranges will be vastly different.

"ON THIS basis, I can quote from records on cracking 28 gravity Smackover gas oil, and 21 gravity Smackover fuel oil, which produced a final 437 end point gasoline ready for blending and shipping of 55.2 gravity, and 53.5 gravity in their respective order. The gasoline from the gas oil had 53 per cent off at 284 degrees Fahr., by distillation, and the gasoline from the fuel oil had 46 per cent off at 284 degrees Fahr. Other similar comparisons bring to light the same facts.

"In each instance, the operation was one of the highest profit for the particular stock being cracked,

What Called Forth Gerstenberger's Reply

(Nov. 9 Issue of N. P. N., page 48)

THE superintendent of a department in a large refinery writes in to comment on an article by D. F. Gerstenberger in the August 17 issue of NATIONAL PETROLEUM NEWS, page 69, entitled, "Cracking Plant Is Best to Handle Crude Oil in Many Cases."

This correspondent, who does not wish his name used, says:

"The author (Gerstenberger) makes a positive statement as follows:

"'It were best that gas oil have an initial boiling point as near 500 degres Fahr. as possible. The higher the initial the less the chance of vaporization in the tubes * * * * when used for cracking.' This has certainly not been the experience at our plant. Cross stills, for example, operating at maximum efficiency, should have a charging stock of around 38 to 42 per cent volatile at 500 degrees Fahr. and 58 to 62 per cent volatile at 540 degrees Fahr. in the Engler flask unless we are to shut down every 4 days for coke, which would be about our cycle with a 500 initial stock."

The commentator goes on to say:

"The author makes another positive statement that the gasoline produced from cracking gas oil is invariably higher in gravity than that produced from residues and crudes. This is a very interesting point and I am going to check up on it from our records. My personal opinion is, however, that Mr. Gerstenberger is in error and that the gravity of the gasoline produced from cracking gas oil and fuel oil with the same intermediate boiling points would vary only slightly. What variation there is I do not believe will be necessarily a higher gravity from gas oil as I believe the gravity is more dependent on type of still in which the cracking is done than on the stock charged to it."

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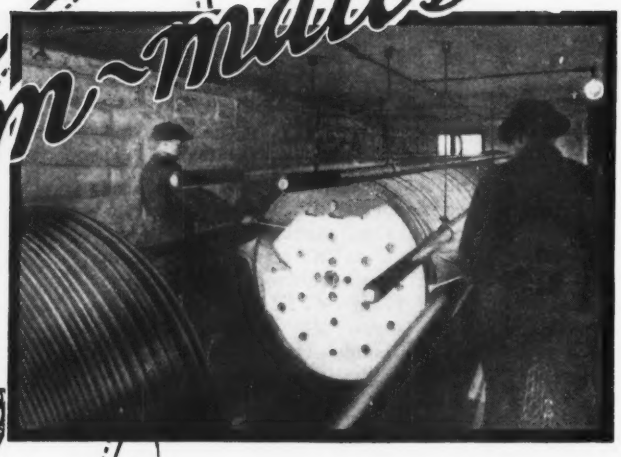

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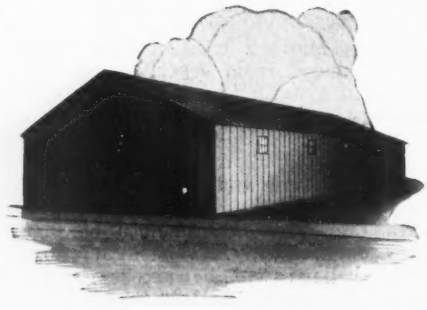

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taking into consideration the condition of the still for cleaning, the time in operation, etc.; in other words all the things to be considered in making that particular operation successful, which is the method by which we must handle such equipment. Of course, it is realized that we cannot handle any and every cracking stock according to a set rule of operation, but that there is a definite amount of recycling, and the percentage of gasoline which we can approach as being the most profitable for different grades of cracking stock. Naturally any comparisons made must of necessity be made bearing in mind the most profitable operation as being the essential.

"Reverting to the first subject for a moment, where coking was experienced from running gas oils with a high initial boiling point, it would appear to me, without knowing other conditions, that the cause of the coking was due either to too low a circulation rate, or not enough recycling, or both. It is a plain certainty, that as the amount of recycle increases, and the quantity of fresh feed is reduced, that although the amount of coke deposited will be greater per barrel of fresh feed, yet in total quantity it will be less, for the reason that the fresh feed has been cut down, and has been replaced by feed stock already cracked which will not yield as much coke from the second cracking, under like conditions.

* * *

"The discussion of such subjects is healthy for the industry, and it would be interesting to hear more from others as to their deductions in instances of vital subjects. Each and all of us can only quote from our particular experiences and plane of vision."

Motor Officials at European Plant

WAUKESHA, Wis., Dec. 31.—J. B. Fisher, chief engineer of the Waukesha Motor Co., has returned from an extended tour of Europe with H. L. Horning, president. They visited many leading automotive plants in England, France, Belgium, Germany and Italy, investigating advanced ideas in designs and methods shown in recent European development. While in England they spent some time with Harry R. Ricardo, British engineer, discussing and exchanging ideas, based upon their recent researches.

At the coming national meeting of the Society of Automotive Engineers it is expected that both Mr. Horning and Mr. Fisher will take an active part.

Mr. Horning expects to return the first week in January in time for the National Automobile Show in New York.

The Chemist Gives Some Inside Stuff On Treating Today's Gasoline

By W. R. Hounsell*

Written Exclusively for National Petroleum News

Copper Treatment for Cracked Distillate

Opinions nowadays differ widely as to what is a "first rate gasoline."

In the accompanying article, written in dialog style, the writer gives his own idea of what a good motor fuel should be.

Through the lecture of the friendly chemist as he goes through the steps of treating the gasoline, the author brings out the cupric ammonium hydroxide treatment which is used by the Houston Oil Co. and for which patent has been applied for. How the copper compound acts on the acetylenes and other constituents that it is necessary to remove from the gasoline is explained.

Of course, the gasoline from every cracking process and generally from every crude presents its own problems of treating and finishing.

THIS article is written sympathetically to the hundreds of refiners who are striving urgently to keep a first class gasoline on the market, despite the fact that more and more cracked distillate and less and less straight run benzine is being pumped to their treaters; with modern epicurean engines and a subnormal market demanding additional specifications such as "benzol equivalent" and "anti-knock constituent".

In order to be of general interest, we must deal here with a specific and unusually difficult case, the practical operation of which is beyond question.

The problem is clearly a chemical one, so let us sample our pressure distillate storage and take a gallon sample of the P.D. to our chemist in his laboratory. Let us have a personal interview with him there.

"Good morning gentlemen, what can I do for you?"

"Well, Mr. Chemist, we understand you know all there is to know about making gasoline from P.D. so we have brought you some pressure distillate and would like to stay right here with you, to see what you can do with it."

"You are decidedly mistaken with regard to my knowledge; I have studied various pressure distillates for years, and admit I know very little about their chemical structure yet. However, just what do you want me to do with this sample?"

"We want you to make a gasoline with U. S. Motor initial and end points, that is sweet to the doctor test, non-corrosive, 25 color Saybolt and stable to direct sunlight for 5 hours. We don't care what the gravity is, but we want to know what the benzol equivalent is and the per cent of anti-knock compounds."

"All right gentlemen, I think I can do that; but how did you make this odoriferous stuff?"

"Well, we are running an 18 Bé. gravity asphalt base crude, containing around 1.5 per cent B.S. and water. It has a flash of 225 degrees Fahr. and contains 2.25 per cent sulfur. The pressure on our plant is 145 pounds with a temperature of 850 degrees Fahr. in the oil leaving the furnace tubes. The P.D. vapor temperature is around 470 degrees Fahr. and we introduce ammonia water into these vapors to neutralize the hydrochloric acid formed by the decomposition of salt.

"Our coke contains caustic soda, so we know that decomposition of salt occurs in our furnace tubes. The gravity of the pressure distillation is about 54 Bé. and the amount of hydrogen sulfide formed during the process is so great that we can't afford to use sufficient ammonia to absorb it as well as the acid. We are content when the water running from the P.D. separators is neutral."

"Thank you very much; now, it seems you are too particular with your gasoline specifications. Why must it meet both doctor and corrosion tests?"

"Mr. Chemist, to be quite frank with you, we want a first rate gasoline. We know that a gasoline that passes the doctor test might be saturated with sulfur and diolefins and what not. Also, a gasoline might pass the corrosion test and have a poor color and an awful odor. But, we have never seen a gasoline that passed the doctor test, corrosion test and stability test that was not of good color and of pleasantly sweet odor. In fact a high grade purified product. We want no kicks from customers the year round."

"Gentlemen, you have put your problem to me squarely, and I hope I am going to show you how to attain your desired product as cheaply as possible. I am going to give myself directions and you must follow me as I carry them out.

"In the first place, the P.D. is reeking with hydrogen sulfide, so pour it into a separatory funnel and wash with water by agitation for a few minutes. Run the water off and let some of it run into a beaker; then dip a small piece of lead acetate paper into this water. The white paper goes black, you see (the lead in the paper combines with the sulfur in the water) showing that the water is dissolving hydrogen sulfide from the P. D. Wash the P. D. in the funnel again and again with water until the lead acetate paper stays white in a sample of the wash water. Now our P. D. smells better and contains practically no hydrogen sulfide in solution. Of course I could have used an alkaline solution to remove the hydrogen sulfide but I am cutting down expenses. Let the P. D. settle awhile until all the water has drained to the bottom of the separator, and draw it off.

"NOW it will take about 6 pounds for 66 Bé. sulfuric acid per barrel of P. D. to polymerize the diolefins and absorb the sulfur compounds sufficiently at least for our purpose.

"This amount of acid will be equivalent to 10 cubic centimeters per 1,000 cubic centimeters of P. D. so we now pour our acid into the separator of P. D. Shake for 10 minutes, intermittently of course, and watch the gums and tars form and run down the glass sides of the separator, or form minute globules which rapidly sink to the bottom. Allow the sludge acid to settle for at least half an hour, then draw it off completely.

"The fine particles of sludge left

*Superintendent, Camden, Ark., refinery, Houston Oil Co. of Texas.

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suspended in the oil will give back their impurities to the oil, on the addition of water; so be sure you allow enough settling time. Now wash with plenty of water and notice how the oil appears to get lighter in color. If this effect is very marked it means you have not allowed enough acid settling time, and some tarry matter has gone back into the P. D.

"Now, while the water is settling I am going to make up a blue treating solution that ought to do the trick. Take a few crystals of copper sulfate, crush them into a powder in a mortar, dissolve them in warm water. Pour about an inch of 14 Bé. caustic soda into a 4-ounce bottle; then pour the copper sulfate solution into the caustic soda and notice the gelatinous light blue precipitate of copper hydroxide that forms, the whole mass becomes almost solid.

"Now, pour into the bottle some aqua ammonia until on shaking, a beautiful blue solution is formed; clear, and smelling of ammonia.

"THIS is our blue treating solution; so we pour a little into the P. D. after the water has been drawn off. Shake the separator for a minute and allow to settle; the solution settles; and notice it is no longer blue, but is colorless and contains a suspension of greenish matter, while the oil has gone to a lemon color due to copper mercaptide in solution.

"Draw off the spent solution and add a little more blue solution, shake, settle and draw off. Do this until the blue solution has no more effect, and thus determine how much of a certain strength solution is just sufficient for treatment.

"Then on the large scale, the amount necessary for exact treatment can be regulated by observation of the color of the waste solution which should be a very faint trace of blue. Here, then, is our treated pressure distillate; pour it into our little steam still here, light a low fire under it—so—and now that the temperature is 220 degrees Fahr. turn on lots of open steam.

"Yes, the knock-back on the fractionator takes care of the heavy ends. Your P. D., you say, contains 85 per cent of gasoline by Hempel distillation to 430 degrees Fahr. vapor temperature. Well, we will just run off 85 per cent and see what we have. This distillate we have made, then, is our gasoline distillate. Pour it into a clean separatory funnel and wash with very little dilute caustic soda solution. Now, let it settle and we will test our finished product.

"There, after all those tests we find just what you are after; a doctor sweet, corrosionless, 25 color, stable to sunlight, sweet odor, U. S. Motor distillation range gasoline, containing 34 per cent of anti-knock compounds, and you will find the benzol equivalent between 20 and 25 per cent by engine test."

"MR. CHEMIST, we are quite satisfied with the product but you have now aroused our curiosity. We want to know why you did what you did; why the P. D. is so hard to refine, and generally how come?"

"Gentlemen, we can come to a better understanding of refining methods that will adequately subdue the difficulties involved where pressure distillate is concerned, if we study the results of the reactions that are going on in our cracking systems. Some of the resultant compounds due to these reactions, of course, are all too obvious in our pressure distillates.

"Some of the desirable compounds and some of the undesirables, contained in the distillate, come unchanged directly from the crude, but by far the majority of both classes of compounds are the direct result of pyrogenic disintegration, and subsequent synthesis into a bigger variety of compounds.

"In other words, our cracking plants are manufactories of chemical compounds differing in molecular structure from the raw materials. These compounds have been isolated by several prominent chemists in various parts of the world, working on various types of oil. They give us a list of the compounds they have discovered in pressure distillates and leave us to pick what we want and leave what we don't want.

"As we cannot do just that we resort to picking out what we don't want, throwing them away, and keeping what we do want. Our problem is to separate the undesirables from the desirables. Some day we might find use even for the undesirables. Now the desirable compounds to be found in pressure distillate are very numerous, but are grouped into families or series for our convenience, and the names of these are the paraffins, olefins, aromatics and naphthenes.

"The chief undesirables can be grouped into diolefins, acetylenes and the whole sulfur fraternity (free sulfur, hydrogen sulfur, thiophenes, sulfenes, alkyl sulfides, mercaptans and alkyl disulfides). There is no need to worry you with the known reactions of the treating agents with these undesirables and it is useless to guess at the unknown reactions.

"We must not think either, that all of these undesirables are ever completely removed in practice for they never are. Suffice it to say that in a general way, the acid and water washes we gave our P. D. removed the sulfur compounds, with the exception of free sulfur, acety-

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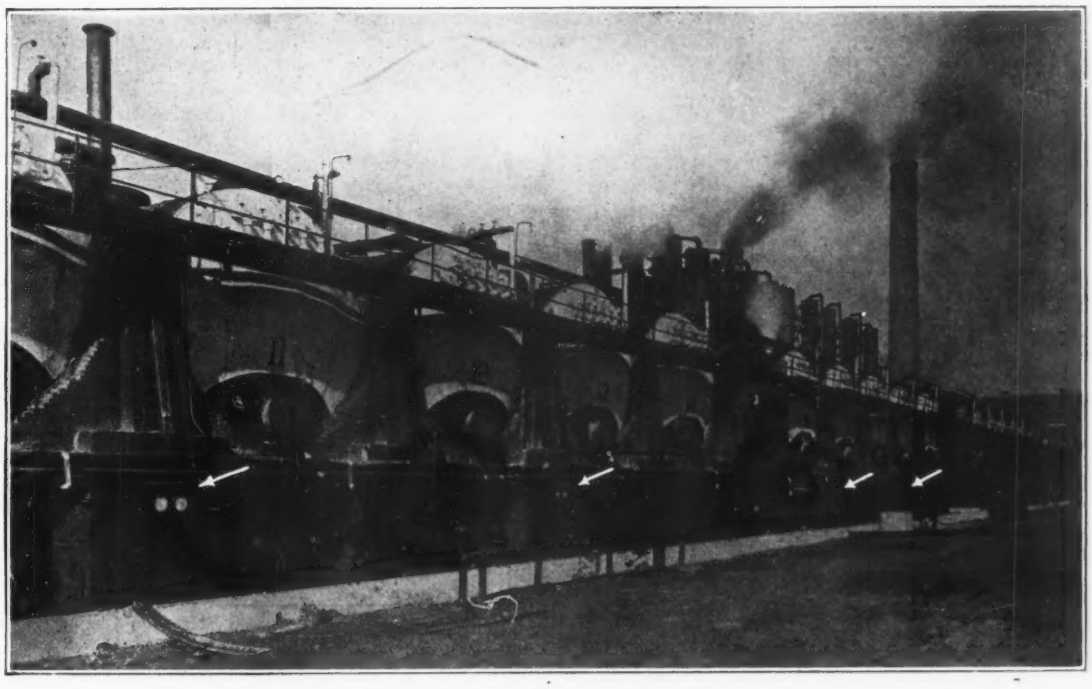

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lenes, mercaptans and disulfides.

"The blue solution removed the acetylenes and entered into combination with the mercaptans and possibly the disulfides, together with other sulfur compounds that escape the acid wash. Then the steam distillation and caustic soda wash removed the free sulfur and the copper-sulfur-hydrocarbon compounds to the desired extent. This blue solution, or cupric ammonium hydroxide treatment, has been in use for two years by the Houston Oil Co. of Texas, and patent has been applied for as a protection.

"THIS subject of treating pressure distillate, instead of being a stumbling block and an incessant worry to us, has now become a very interesting subject. If you can spare the time, Mr. Chemist, we would like to ask a few more pertinent questions. While you were using your treating solution, we wondered why sodium plumbite (doctor solution) wouldn't answer the same purpose. Would you mind enlightening us?"

"Not at all; as a matter of fact, I had no business introducing a new treating method without explaining the reason for so doing. Now, certain elements (in our case, metallic elements) and bases of these elements, have greater affinity for sulfur and sulfur radicals than have certain other elements.

"This also means that certain metallic atoms attach themselves to sulfur atoms or to complex sulfur bearing molecules, more readily than do other metallic atoms. On analyzing the case in point, we find that, under certain conditions, atoms of silver, copper, mercury, or arsenic have a greater affinity for the sulfur in our pressure distillate than have atoms of antimony, tin or lead.

"In addition, we know that silver and copper form complex salts with the evil smelling acetylenes, thus removing the latter from our oil by dissolution of these salts in water. We are thus left with the copper atom as our final choice among the common metals, silver being too expensive. The late Dr. David T. Day in one of his many worthy discoveries, has shown us the advantages of treating oil with cuprous chloride; but, we cannot use this solution in practice on account of its corrosive action on iron.

"Finally, then, we use cupric ammonium hydroxide in solution as a treating agent because of its efficiency in action with sulfur compounds and acetylenes, its comparative cheapness, alkalinity or inaction with iron, and its instability to a point where the copper atom is not too strongly bonded in the molecule."

"Just a minute, Mr. Chemist, you have already gone too deeply into the chemistry of the subject for us to follow very rapidly, but we are certainly convinced on the vital points. Now, we would be indebted to you for a few more practical explanations. With reference to this specific sample of distillate we gave you, is it possible to make the gasoline we want without the expense of re-running? Also, can this gasoline be made from this pressure distillate without the use of sulfuric acid but using the steam still for re-running?"

"Gentlemen, when you ask me, is this possible, and can this or that be done, I must admit that I do not know, because some day I hope these problems will be solved and a suitable solvent be discovered. With regard to this specific pressure distillate, I have made a gasoline without using a second distillation in the process. First, the pressure distillate must have the gasoline distillation range, then sulfuric acid treatment is used as before; then an oxidizing agent (I used potassium permanganate in my experiment) is introduced. Then, the water washes and the blue solution treatment. Then, in order to remove the color (partly due to copper mercaptide in solution) the gasoline is filtered, after agitation with fine fuller's earth.

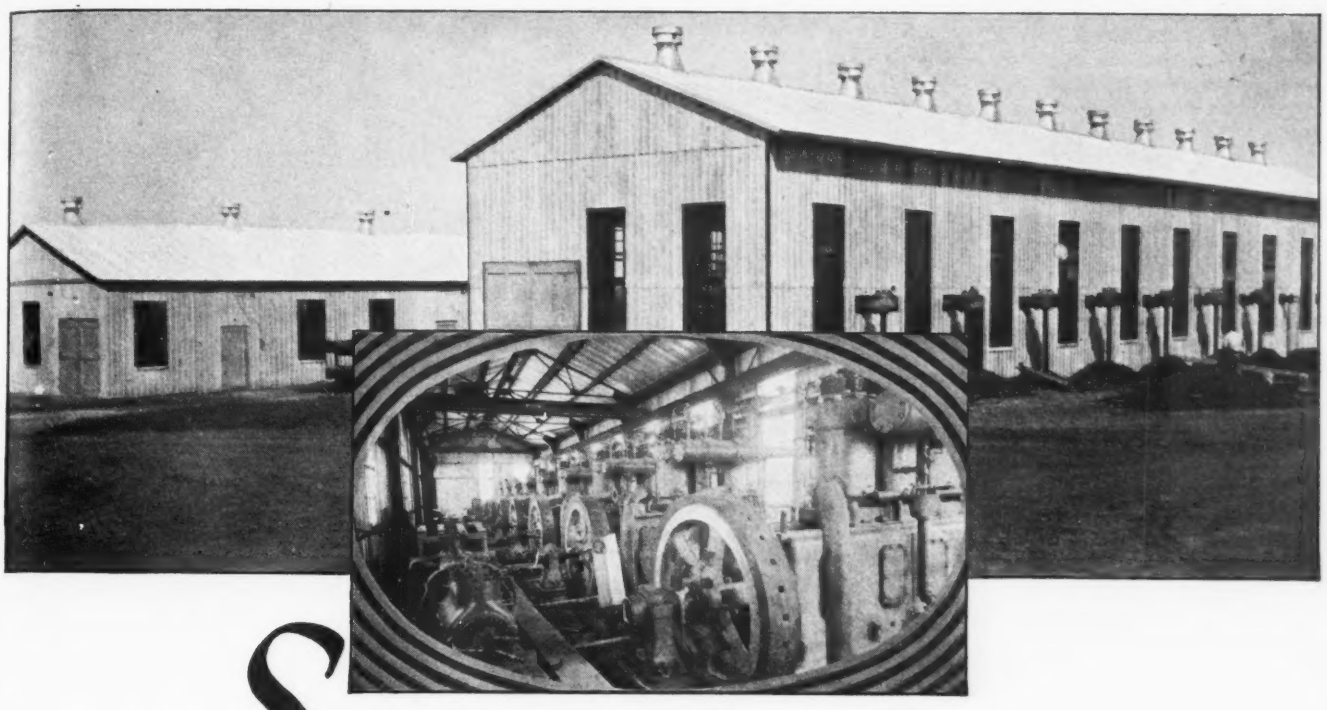
"THE final product was as good as you specify, but the amount of fuller's earth necessary was enormous. The oxidizing agent was used as a stabilizer, because, if it is not used, the gasoline, which is sweet before addition of fuller's earth, turns sour to the doctor test afterwards, due to the destabilizing effect of fuller's earth, and the reversion of unstable sulfur compounds into the oil. So you see this method is very expensive and not recommended.

"Then, again, if the sulfuric acid treatment is left out prior to the steam distillation, the resultant gasoline is unstable in sunlight and the gumming test shows too much diolefin content, although the product passes all the other tests."

"Well, Mr. Chemist, we certainly appreciate and will try to retain all you have explained. Before we go: what is your opinion on the necessity of the doctor test, as we read so many articles stating that this test is antiquated and absolutely superfluous and unnecessary?"

"Well, I have read several similar articles, and have had short talks on this subject of gasoline testing, with several men; each of whom seems to have his own pet aversion to one test or another. Some don't think the doctor test at all necessary, some the corrosion test, or the initial specification, the distillation range curve, the stability test, color, odor, and some go so far as to wonder why the old 450 end point isn't quite all right.

"In a general way, gentlemen, when you find someone underestimating the value of a certain test, first of all look for some ulterior motive."



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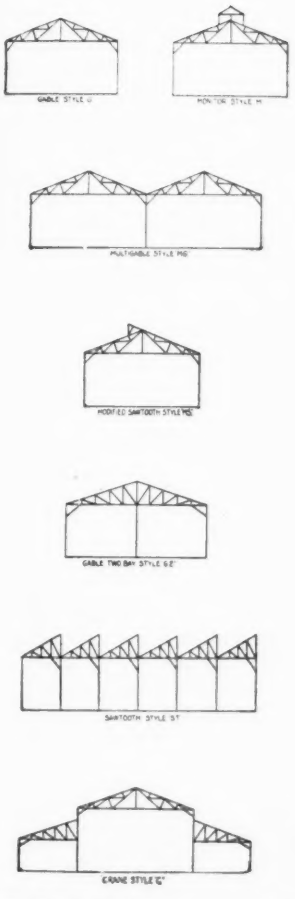

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England Discards Petrol Tins For Drive-In Stations

CLEVELAND, Dec. 31

PROOF that the American idea of drive-in filling stations is fast spreading over the civilized world is furnished in the accompanying pictures.

Today gasoline is sold to the motorist in England or in Honolulu in much the same fashion as it is on Kings Highway boulevard in Kansas City, except that the Honolulu motorist may drive leisurely to his station underneath the stately palm, whereas the American motorist speeds to his to the clang of traffic and the honk of motor horn.

Stations that are just as attractive and as serviceable as any in America are now being built and operated in England. Experiences and demands during war brought about the filling station idea as a successor to the old method of selling gasoline in tin cans, W. H. Berry, founder and editor of *"The Service and Filling Station,"* London, says.

By W. H. Berry

AT THE end of the war, it is estimated that there were some 3,000 fuel pumps and storage tanks in the country. The filling stations came later. The movement originated with one of the big oil importing groups, which set up a few strictly isolated and generally neat and spacious stations on island sites, or at least with the advantage of an island lay-out for the pumps. Air and water were featured as free supplies. As a result of pressure from the retail motor trade, these group-owned stations now limit their fuel-station services to trucks and taxi-cabs, cars being debarred.

That arrangement continues, although in the meantime there has been a steady increase of private filling stations and of garages fitted with pumps. The number of fuel pumps in the country has been estimated at 100,000, which includes many set up by the railway companies and bus owners and other carrying interests, as well as scores of large commercial users such as brewers and millers, haulage and other contractors, etc.

So rapid is their development that a compact was recently made between the big fuel groups and the Motor Dealers' Association, to limit pump facilities to persons approved first by the local branches of the association

Filling station and garage owned by J. E. Dixon, at Putney, England. The Englishman's love of gardens is apparent from the well-kept flowers and shrubs shown to the right

Here is another filling station of the Associated Oil Co., enjoying the palms and other tropical advantages of Manila, in the Philippines

and finally approved by a joint committee in London.

It may be explained that the bulk of fuel pump installations hitherto have been put through the "group" on a gradual payment basis with nominally a 10 per cent deposit per pump, the balance being paid out of the profit on the retail sale of fuel. Until recently, the rate was 1½d (3 cents) per gallon metered, but it is now reduced to ½d (1 cent) per gallon; the difference being given to the public by way of reduction of the retail price. It has been further proposed—largely, it would seem, as the outcome of the presence of new and independent fuel importers—to give a special increased discount to members of the Motor Dealers' Association, on condition of confining their fuel sales to "group" hands. The issue has yet to be dedetermined, but it is significant that the sales of pumps to independent users is greater than ever.

The big "groups" make themselves responsible for the maintenance of their pump installations. They also seal them, and only their tank men and inspectors have access to them. This method has much to commend it and is being adopted by independent pump owners in conjunction with the suppliers of the pumps; but, of course, without the metering supervision of sales.

An up-to-date drive-in station of the Union Oil Co. of California in Honolulu, wearing its best dress of Hawaiian palms and other vegetation the year round

The question is asked, do filling stations, limited to fuel and lubricant sales, pay? The answer is, yes, when the conditions, including such factors as site, enterprise and outlay, are right. It is not uncommon to find stations, with four or five pumps at the start, increase the installation by 50 and even 100 per cent after a year's business. In these cases, many are helped by such improving conditions as increase of residents, growth of local and through traffic, especially in areas served by the new arterial roads. These roads represent a post-war national effort of road improvement which is costing about 50 million pounds a year, to which motor taxation (by horse power) is contributing about 20 millions yearly.

The increase of independent filling stations is shaping to have a marked influence on the improvement of motor servicing. It is the rule now to combine the titles "filling" and "service" stations, which implies that very much more is being catered for than was the case at the outset of the new movement. This development is likely to change the face of the garage trade, since it has little in common with the prewar outlook of the average garage man.

These new combined stations are mostly financially backed by business people. They are conceived and laid out on generous lines and architects are increasingly employed to design them, which inevitably will have a good effect in staying the complaints (some of them of "stunt" origin) that

Japan's contribution to filling station architecture. It is operated by Yukata Shokai, at Tokyo, and sells Associated gasoline of the Associated Oil Co., San Francisco

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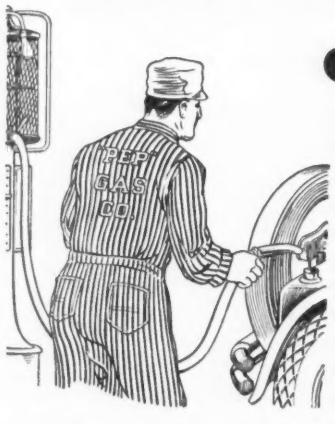

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filling stations offend against public and scenic proprieties. They are being fitted with plant and appliances for the complete servicing of cars at a cheaper rate than is possible in a private garage. On this score it is significant that last year America's biggest customer for service plant was Britain; to which must be added the servicing plant made here, and the gradual building up of British pump and fuel and oil-tank manufacture.

A slow but promising development allied with filling and service stations, but mainly limited, as will be understood, to stations in rural areas, is the presence of refreshment and rest rooms, with parking space for cars, tennis courts and, in a few localities, a golf course.

Golf is displacing cricket as the chief British game, and the majority of light car owners who, whether ladies or men, drive their own cars, are feeding the supply to an immense extent. These motorists will be, and are now, the chief supporters of filling and service stations, and may be regarded as an important link in the post-war chain of the altogether new British motoring outlook.

Equipment Manufacturer Dies

IONIA, Mich., Dec. 29.—A. P. Fleckenstein, president of the Fleckenstein Visible Gasometer Co., died at his home here Nov. 18. He was 57 years old. Mr. Fleckenstein was well-known around jobbers' conventions, attending many state and national gatherings.

Before becoming a manufacturer Mr. Fleckenstein was a traveling salesman, and did much work on transportation rates and schedules. Mr. Fleckenstein is survived by his widow and two grown sons.

Graver Opens Fort Worth Office

HOUSTON, Dec. 29.—Texas district offices of the Graver Corp. are being opened in the Petroleum building at Fort Worth, with H. E. Clark in charge of refinery equipment sales and Tom Crosby in charge of tankage sales. Clark is moving to Fort Worth from Houston and Crosby is changing his headquarters from Tulsa.

Small Refinery for Yates Pool

WICHITA FALLS, Dec. 27.—The Valley Refining Co., Dec. 26, shut down its plant here indefinitely. The company is planning to build a 2,500 barrel plant at Pyote in the Pecos county, Texas, field, which is expected to be in operation within a few weeks.

LOUISVILLE, Dec. 29.—Berry V. Stoll, vice president in charge of refining for the Stoll Oil Refining Co. here, was recently elected president of the board of park commissioners of Louisville. Mr. Stoll was appointed to the board by recently elected Mayor William B. Harrison.

Glances at Oil Technology of the World

National Petroleum News

Cracking Wax Oil

INTERESTING experiments were carried out in a Russian laboratory on the cracking of a wax oil which had a density of 0.833. This oil was cracked in a still of two and one half liters capacity (a little over 2½ quarts) and the still was provided with a dephlegmator and condenser and pressure regulator.

The products that were obtained in this method were analyzed by the Egloff method. The yield of benzine and kerosene was found to increase with the duration of cracking up to a maximum point, which was not dependant on the temperature. The yield of benzine was 38 to 39 per cent and of benzine and kerosene 65 per cent, higher yield being obtained by repeated cracking.

The time that it required to attain the maximum yield was found to be influenced by the temperature, the rapidity of cracking increasing some five times for each increase of 25 degrees from 375 to 500 degrees Cent. The residue had an increased resin acid number and the density of the mass was as high as 1.04.

Long duration of cracking favors the production of asphaltenes and carboids. The cracking of solar oil is twice as slow as that of wax oil, and the cracking of kerosene still slower.

No condensation products nor naphthenes result from the cracking of paraffin wax. Oils with high aromatic content yield the most coke. The cracked products contained from 4 to 7 per cent of naphthenes, 60.7 to 49.6 per cent of paraffines, 14.3 to 19.6 per cent of aromatic hydrocarbons and 7.0 to 25.5 per cent of olefines. (A. Sachanen and M. Tilitscheyev, Petroleum Zeitschrift, 1927, vol. 23, pp. 521-25.)

Softening Point Determination Apparatus

THE softening point of paraffin and other similar product has been determined for the most part by making a stopper out of the paraffin to close up one end of a glass tube which has two closed ends and then pouring five grams of mercury on top of the paraffin and heating the tube, making observation of the temperature at which the mercury passes through the paraffin. There are all sorts of disadvantages connected with this method, the most important being the great difficulty of securing a correct value for the softening point of the substance and also of establishing accurately enough points so as to be able to draw a true softening point curve for the material tested.

A new apparatus has been developed for this purpose. This consists of a beaker of about 85 millimeters diameter and 165 millimeters high into which a narrow beaker of about 70 millimeters diameter and 130 millimeters height is suspended by means of a ring. Both beakers are filled to a certain height with the heating fluid. The height of the heating medium is approximately 12 to 13 centimeters in the outer beaker and about the same in the inner. Water or paraffin oil is used as the heating medium.

The narrower beaker is provided with a metal cover, provided with an opening for a thermometer and another in which a cylindrical brass body about 60 millimeters high and 20 millimeters diameter is solved.

The lower end of the cylinder is bored centrally to give a hole of 11 millimeters width and up to a depth of 30 millimeters; then the width of the boring is narrowed to 4.2 millimeters. A round brass rod of about 4 millimeters diameter and 205 millimeters total length is easily slipt into the narrower hole and on this brass rod a mark is placed at 110 millimeters from the bottom. A small adjustable collar is placed on this rod, so that the rod can be lifted out only up to this mark. On top of the rod is placed a cylindrical brass weight of 10 millimeters diameter and 30 millimeters length, which is provided with a 4.1-millimeter hole. This weight can be fastened to the rod at any suitable height by means of a set screw.

The rod can, of course, fall only to the lower end of this weight. The height of fall can be adjusted by adjusting the position of the weight. It is also seen that the rod is attached at its uppermost part by means of a string around a pulley and to a counterweight. This arrangement is for recording the fall of the rod on a graduated scale. (Further details of dimensions are given in the original article.) The sample is contained in a U-tube, shown, whose dimensions are given in the original article.

The principle on which the testing is conducted is to have the pointer of the indicator at the zero point when the punch at the end of the rod is just in contact with the mass that is being tested. Then the little tube is pushed down until the first signs of resistance to its passage are felt and the tube is then fixed by means of the set screw. The pointer is then set at zero and as the mass softens under the influence of heat, the rod sinks into the paraffin and this fact is indicated by the movement

Inorganic Substances

	Acid No.	Tar No.	% Soluble in H_2SO_4	Saponification No.	Slime	Cork
	8.6	5.7	25	5.3	none	attacked
Potassium hydroxide	7.0	—	22	—	"	"
Sodium hydroxide	16.8	14.4	44	28	"	"
Magnesium oxide	4.1	3.8	19	—	"	"
Calcium oxide	7.2	—	24	—	"	"
Alumina	6.7	6.2	23	—	"	"
Iron oxide	20.0	—	44	—	"	"
Copper oxide	13.2	—	—	—	"	"
Nickel oxide	4.9	—	—	—	"	"
Litharge	1.9	1.8	16	6.3	turbid	slightly attacked
Red lead	5.6	5.3	26	17.5	"	"
Lead peroxide	18.2	16.0	48	45	"	"
Potash	14	—	34	—	"	"
Soda	11.4	—	31	—	none	attacked
Magnesium carbonate	4.9	3.6	19	—	"	"
Waterglass	10.2	—	28	—	"	"

Organic Substances

	Acid No.	Tar No.	% Soluble in H_2SO_4	Saponification No.	Slime	Cork
	8.6	5.7	25	5.3	none	attacked
Tartaric acid	8.2	—	25	—	"	"
Salicylic acid	4	—	17	—	"	"
Oxalic acid	19	—	42	—	"	"
Oleic acid	18	—	34	—	"	"
Phenol	33	19.7	55	58	"	"
Starch	20	16.2	44	49	"	"
Hydroxylamine hydrochloride	2.4	—	11	—	"	"
Pyrogallol	0.03	0.02	0	0		not
Aniline	0.08	0.06	0	0	turbid none	attacked "

of the pointer. The normal fall of the rod or its penetration into the mass of paraffin is 20 millimeters and the pointer moves from 0 to 100 during this fall.

This apparatus shows the slightest change in the material and the softening curve obtained.

For further details on this interesting process and apparatus, see Dr. H. Herbst's article in Petroleum Zeitschrift, 1927, pages 1079-1080.

Effect of Addition of Salts and Organic Substances on Highly Refined Oil

A NUMBER of inorganic salts and organic substances were tested as far as their action in oxidizing the oil is concerned. Samples of 150 grams of the oil were placed in a 300-cubic centimeter Erlenmeyer flask and heated to a temperature of 120 degrees Cent. with the addition of 0.5 gram of the various chemicals, the heating being carried out for 70 hours with passage of a current of oxygen gas. The acid number and the quantity of sulfuric acid soluble ingredients were determined and the quantity of slime formed was observed, as well as the action on the cork closing the flask.

The tar number and the saponification number were also established. The quantity of sulfuric acid soluble ingredients gives a particularly good picture of the quantity of conversion products, while the nonsludging oil contained no sulfuric acid soluble ingredients before oxidation.

The results that were obtained in these experiments are shown in the tabulations on preceding page.
(Dr. V. D. Heyden and Dr. Typke, Petroleum Zeitschrift, 1927, No. 29.)

FOREIGN PATENTS

German Patents

Refining

Issued Sept. 8, 1927

Continuous Distilling and Cracking Oils. A condensing period with or without dephlegmation follows directly after the vaporizing period or pyrogenation. This process is carried out in an apparatus with staged and methodical heating. The apparatus consists of several retorts, either horizontal, inclined or vertical, with an internal heating chamber. The hydrocarbons are circulated around this chamber in a coiled tubular conduit. A. A. F. M. Seigle, Paris, France. Filed July 16, 1920. 445,657.

Neutral, Sediment-Free, Air-Resistant Coal Tar Lubricating Oils Mixed With Mineral Oils. The tar oils are not first isolated, but are subjected to the action of solid alkali during the distillation of the tar. Then the distillates are quickly cooled down in a vacuum. The oils are then mixed with mineral oil products. "Rex" Mineraloel Gesellschaft Stephan, Book & Ziegler, Essen, Germany. Filed April 10, 1924. 445,679.

Issued Sept. 22, 1927

Natural Vaseline From Crude Oil. Paraffin-containing tar is mixed with a paraffin-less or vaseline oil with the aid of a solvent, for example benzine, and the mixture is then filtered through decolorizing media. M. Rieger, Lemberg, H. Wasiewicz, Drohobyoz and L. Rieger, Lemberg, Poland. Filed Oct. 4, 1921. 430,499.

Production

Issued Sept. 8, 1927

Cable Drilling Machine. The working cable consists of three parts. The middle portion, carrying the drilling apparatus proper, is comparatively short. This portion is connected with the cables that pass over drums. An arrangement of pulleys carries the cables from the actuating or driving means. V. Meganck and Foraky, Societe Anonyme Belge d'Enterprise de Forage et de Foncage, Brussels, Belgium. Filed Feb. 11, 1925. 445,726.

Miscellaneous

Issued Sept. 8, 1927

Continuous Heating of Oils and Hydrocarbons. The arrangement consists of oil heating coils which are interchangeable and of different internal widths and staged, shuntable resistances. K. Hering, Nuernberg, Germany. Filed Sept. 8, 1922. 445,733.

Issued Sept. 15, 1927

Process for Bending Tubes. Longitudinal grooves are pressed into the inner side of the pipes where the bending is to take place. Vollmann & Schmelzer, Iserlohn, Germany. Filed May 30, 1926. 445,903.

Issued Sept. 29, 1927

Pipes From Sheet Metal. The sheet metal is bent in the form of a spiral and is cut through in the longitudinal direction. The cut edges are then joined together. W. R. Hume, Melbourne, Australia. Filed Dec. 19, 1924. 446,279.

Meter for Gases and Liquids. A device which is characterized by a series of pistons in cylinders whose diameters are as 1 to 2. P. Christlein, Nuernberg and K. Werner, Eibach near Nuernberg, Germany. Filed July 4, 1923. 446,570.

French Patents

Refining

Issued Aug. 18, 1927

Producing Aromatic and Other Hydrocarbons. I. G. Farbenindustrie A. G. Filed Feb. 25, 1927. 629,838.

Refining Liquid Hydrocarbons, process and apparatus. The Silica Gel Corp. Filed March 2, 1927. 630,081.

Continuous Treatment of Hydrocarbons. Allgemeine Gesellschaft fuer Chemische Industrie m.b.H. Filed Feb. 25, 1927. 629,864.

Filed Sept. 1, 1927

Converting Hydrocarbons of Low Boiling Point Into Low Boiling Hydrocarbons with the aid of aluminum chloride, the hydrocarbons being first refined with liquified sulphurous acid. Allgemeine Gesellschaft fuer Chemische Industrie m.b.H. Filed March 4, 1927. 630,174.

Issued Sept. 8, 1927

Antiknock Motor Fuel. Societe Internationale des Combustibles Liquides. Filed March 5, 1927. 630,326.

Miscellaneous

Issued Aug. 18, 1927

Improvement in Heat Exchangers. A. E. Leek. Filed Feb. 22, 1927.

Issued Sept. 1, 1927

Purifying Lignite Waxes. A Maihle. Filed May 18, 1926. 630,220.

Emulsifying Bitumen, Asphalts, Pitch, Tar, Coal Tar Oil, etc. H. Basset and V. Szidon. Filed March 4, 1927. 630,168.

Issued Sept. 8, 1927

Improvement in Heat Exchangers. E. J. Decoster. Filed May 28, 1926. 630,450.

Continuous Production of Liquid Hydrocarbons, from coal. Societe Internationale des Combustibles Liquides. Filed March 5, 1927. 630,324.

Liquefaction of Hydrocarbons by hydrogenation. Societe Internationale des Combustibles Liquides. Filed March 5, 1927. 630,328.

British Patents

Refining

Issued Sept. 28, 1927

Cracking Liquid Hydrocarbons. An arc, which by reason of the rotation of the electrode is caused to elongate, is formed within a body of liquid hydrocarbons, and is then quenched, a second arc being struck at the point where the first arc was formed. Acetylene, carbon black as well as light and easily condensable hydrocarbons are obtained. C. Londhi, Milan, Italy. Filed March 1, 1926. 275,281.

Cracking Shale Oil, Asphaltic Base Crude Oil, Cracking Oils, etc. The cracking is effected at 750 to 1000 degrees Fahr. and 50 to 1000 pounds per square inch pressure. The distillates are extracted with caustic soda to obtain mixtures of phenols, cresols, etc. R. Cross, Kansas City, Mo. Filed May 3, 1926. 275,313.

Issued Oct. 5, 1927

Refining Oil With Sulfur Dioxide. The process is applied to such oils as kerosene, transformer oil, light lubricating oils and the like, which are distilled. The distillates are subjected to continuous treatment with sulfur dioxide. The continuous evaporation process is divided into several pressure stages in the last of which a high vacuum is employed. Allgemeine Gesellschaft fuer Chemische Industrie, Berlin, Germany. Filed March 2, 1927. 275,884.

Issued Oct. 12, 1927

Purifying Shale Oils. The objectionable high color of disinfectant products produced from these oils is removed by treating the oil with an aqueous solution of borax or the equivalent of boric acid and alkali. S. Caplan, Brooklyn, N. Y., assignor, Combustion Utilities Corp., New York, N. Y. Filed Dec. 30, 1926. 276,216.

Testing Lubricating Efficiency of Oils. Two containers are provided, one containing the oil and the other the standard liquid. Means are provided whereby the liquids are caused to flow under like conditions from the receptacles to the containers and vice versa of the purpose of observing the rates of flow F. B. Mason, New Providence, N. J. Filed May 9, 1927. 276,281.

Distilling Oils Particularly for Producing Lubricating Oils. The apparatus is of the separate heater and evaporator type. The liquid is fed from the heater to the evaporator at a regulatable rate. M. Singer, Bucharest, Roumania. Filed April 19, 1927. 276,302.

Issued Oct. 19, 1927

Purifying Cracked Oils. The more unsaturated constituents of cracked oils are removed by heating with ferric chloride containing water. I. G. Farbenindustrie A. G., Frankfurt on Main, Germany. Filed May 26, 1926. 276,427.

Cracking Hydrocarbons. The vapors from a cracking still are passed through a region in which a constant temperature is maintained by introducing into contact with the vapors a liquid such as water of benzol or a mixture of liquids having a constant boiling point. J. F. P. de La Riboisiere, New York, N. Y. Filed Nov. 12, 1926. 276,532.

Production

Issued Sept. 28, 1927

Hydraulic Driven Drilling Apparatus. The tool is operated by means of a hydraulic motor or turbine which is arranged near the bottom of the well. The turbine is driven by

water which on discharge returns to the surface level outside the tubing carrying the device. The turbine and drilling tool, etc. are freely suspended so that they can be raised or lowered through the casing. E. Lachamp, Vienna, Austria and E. Perret, Geneva, Switzerland. Filed June 18, 1926. 275,379.

Issued Oct. 12, 1927

Rotary Well Drilling Apparatus. The swivel body, which supports the stem that carries the drilling tools, is made so that it can move universally. This is done through a system of trunnions. R. Taylor, Los Angeles. Filed Feb. 1, 1927. 276,230.

Issued Oct. 19, 1927

Gas Holders. The storage tank, used for gases or volatile liquids, has a flexible metal roof which in its normal position forms an inverted cone and rests on a stationary structure arranged inside the tank, but when the pressure of the gases or vapors inside the tank increases moves upwards until it assumes a conical position. J. H. Wiggins, Bartlesville, Okla. Filed Aug. 10, 1927. 276,653.

Miscellaneous

Issued Sept. 28, 1927

Destructive Hydrogenation. The heat required for the reaction is supplied wholly or partially by the injection of a preheated gas instead of through the walls of the reaction vessel. I. G. Farbenindustrie A. G., Frankfort on Main, Germany. Filed July 28, 1927. 275,248.

Catalytic Oxidation of Hydrocarbons. Hydrocarbons are mixed with oxygen containing gas and passed through a number of small reaction zones arranged in a medium of high heat conductivity. E. I. du Pont de Nemours & Co., Wilmington, Del. Filed May 3, 1926. 275,321.

Motor Fuel. Reduced knocking is obtained with a fuel composed of cyclic compounds extracted from kerosene by liquid sulfur dioxide. H. F. Parker, London, England. Filed May 5, 1926. 275,334.

Synthetic Liquid Fuels. The gaseous products from the combustion of tars, heavy oils, etc. are hydrogenized in the presence of a catalyst. Societe Internationale des Procedes Prudhomme-Houdry, Paris, France. Filed July 12, 1927. 275,585.

Hydrogenizing Oils. Light hydrocarbons are obtained from heavy hydrocarbons by mixing the latter with powdered carbonaceous substances and distilling the mixture between 200 and 800 degrees Cent. H. Marchand, Favergres, Haute Savoie, France. Filed Aug. 5, 1927. 275,642.

Issued Oct. 5, 1927

Destructive Hydrogenation by Catalysts. Various catalysts are described. I. G. Farbenindustrie A. G., Frankfurt on Main, Germany. Filed Aug. 8, 1927. 275,662, 275,663, 275,664, 275,670, 276,001. (Filed Aug. 11, 1927).

Bituminous Emulsions With Petroleum Tar. Used for road construction. Ruetgerswerke A. G. and L. Kahl, Charlottenberg, Berlin Germany. Filed March 18, 1927. 275,928.

Issued Oct. 12, 1927

Pipe Joints. Joint is made with flange that has a thin web portion which is distorted by the pressure within the pipe to make hermetic contact with the web portion of an adjacent flange. G. Whitelaw, Birkenhead, Cheshire, England. Filed Aug. 9, 1926. 276,135.

Heat Exchangers. These are characterized by an arrangement of baffle plates and the distribution of these plates in the fluid inlets. Babcock & Wilcox Co., New York, N. Y., assignors, Babcock & Wilcox Ltd., London, England. Filed March 22, 1927. 276,262.

Issued Oct. 19, 1927

Bituminous Emulsions. Petroleum asphalt is used in making emulsions with aid of a solution of alkali carbonate. These emulsions are used for road making, bituminous cements and paints. Mineral A. G. Brig, Brig, Switzerland. Filed Dec. 3, 1926. 276,543.

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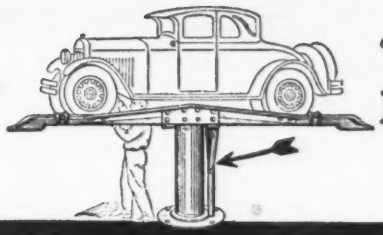

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Roster of Oil Associations

National Petroleum News

American Association of Petroleum Geologists Business Manager, J. P. D. Hull, Box 1852, Tulsa, Okla.

American Chemical Society, Petroleum Division Mellon Institute, Pittsburgh, Pa. Secretary, George A. Burrell, 1501 Columbia Bank Bldg., Pittsburgh, Pa.

American Gas Association, Graybar Bldg., 420 Lexington Ave., New York City. Secretary Alexander Forward.

American Institute of Mining and Metallurgical Engineers, Petroleum Division. 29 West 39th St., New York. Chairman, Petroleum Section, F. Julius Fohs.

American Oil Burner Association, 350 Madison Ave., New York City. Executive Secretary, Leod D. Becker.

American Oil Chemist Society, 705 Tchoupitoulas St., New Orleans, La. Secretary-Treasurer, J. C. Helm.

American Oil Men's Association, 624 South Michigan Ave., Chicago, Ill. James A. Gilmore, Secretary.

American Petroleum Institute, 250 Park Ave., New York City. Secretary, R. L. Welch.

American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa. Secretary-Treasurer, C. L. Warwick.

Arkansas Petroleum Club, Secretary, James P. Lavery, Petroleum Supply Co., El Dorado, Ark.

Arkansas-Tennessee Oil Marketers Association, Secretary, R. E. McKellar, care Diamond Oil Co., Memphis, Tenn.

Association of Oil Jobbers of Mississippi, Jackson, Miss. President, R. C. Clark, Independent Oil Co., Tupelo, Miss.

Association of Natural Gas Supply Men, Inc., 905 Oliver Bldg., Pittsburgh, Pa. Secretary, Guy F. Batchelor.

Association of Producers of Petroleum in Mexico, 17 Battery Place, New York. Director, Guy Stevens.

Association of Producers of Petroleum in Venezuela, 17 Battery Place, New York City. Director, Guy Stevens.

Chamber of Mines & Oils of California, 206 So. Spring St., Los Angeles, Calif.

Cincinnati Oil Club. Secretary, George H. Siemer, Merchants Oil Co., Cincinnati, O.

Detroit Petroleum Club. Secretary, Frank McSweeney, Cities Service Oil Co., General Motors Bldg., Detroit, Mich.

Eastern Kentucky Oil Producers Association, Ashland, Ky. Secretary, David Browning.

El Paso Petroleum Club. President, A. L. Behringer, Home Oil Co., El Paso, Tex.

Georgia-Alabama Independent Petroleum Marketers Association. Secretary-Treasurer, W. L. Moore, Wofford Oil Co. of Georgia, Atlanta, Ga.

Georgia Independent Oil Marketers Association. Secretary-treasurer, J. K. Ezell, American Oil Pump & Tank Co., P. O. Box 982, Atlanta, Ga.

Greater Chicago Oil Men's Club. Secretary, Mel Keim, Apex Motor Fuel Co., 4555 W. 26th St., Chicago, Ill.

Gulf Coast Independent Oil Producers Association, 403 Goggan Bldg., Houston, Tex. Secretary, T. L. Smith, Jr.

Illinois Petroleum Marketers Association. Secretary, G. A. Primm, Chamber of Commerce Bldg., Springfield, Ill.

Independent Oil Men of America, 624 S. Michigan Ave., Chicago, Ill. L. V. Nicholas, President.

Independent Oil Men's Association of Massachusetts. Secretary, F. E. Bergfors, care Quincy Oil Co., Quincy Adams, Mass.

Independent Oil Men's Association of New England. Secretary, I. H. Farrar, Berkshire Oil Co., Worcester, Mass.

Independent Oil Marketers Association of Atlanta, Ga. Secretary, J. H. Smitha, care Community Oil Co., Atlanta, Ga.

Independent Petroleum Marketers of Middle Atlantic States. Secretary, E. Walter Hudson, Cameron & Paxton Sts., Harrisburg, Pa.

Indiana Independent Petroleum Marketers Association. Field Secretary, Sam T. Hurd, Hotel Severin, Room 306, Indianapolis, Ind.

Iowa Independent Oil Men's Association, 225 Fifth St., Des Moines, Ia. Secretary, M. L. Long.

Kansas Oil Men's Association, 423 First National Bank Bldg., Wichita, Kan. Secretary, J. A. Motter.

Kentucky Oil Men's Association, Inc., 610 Trust Co. Bldg., Lexington, Ky. Secretary, Thomas S. Scott.

Kentucky Petroleum Marketers Association, 3401 Bank St., Louisville, Ky. Secretary, L. J. Connelly.

Maine Independent Oil Dealers Association. President, Theodore E. Emery, president, Kennebec Oil Co., Augusta, Me.

Michigan Independent Oil Men's Association, 1005 Grand Rapids National Bank Bldg., Grand Rapids, Mich. Secretary and Treasurer, Wayne C. Hughes.

Mid-Continent Oil & Gas Association, 505 Cosden Bldg., Tulsa, Okla. Secretary, Harry H. Smith.
Kansas-Oklahoma Division, 505 Cosden Bldg., Tulsa, Okla. Secretary, Harry H. Smith.
Louisiana-Arkansas Division, 724 Giddens-Lane Bldg., Shreveport, La. Secretary, Joseph B. Elam.
Texas Division, P. O. Drawer 1567, Dallas, Texas. Secretary, J. P. Laney.

Minnesota Petroleum Association, 638 Builders Exchange, Minneapolis, Minn. Secretary, Paul E. Hadlick.

Mississippi Oil Men's Association. Secretary, J. J. McEwen, 501 Capital National Bank Bldg., Jackson, Miss.

Missouri Oil Men's Association, 217 Dwight Bldg., Kansas City, Mo. Secretary, George S. Allee.

National Association of Independent Oil Producers, 414-419 Ritz Bldg., Tulsa, Okla. President, William H. Gray.

National Gasoline Dealers Association, Inc., 280 Madison Ave., New York City. Secretary, Thomas P. McKee, Jr.

National Petroleum Association, Munsey Bldg., Washington, D. C. Washington Counsel, Fayette B. Dow.

Natural Gas Association of America, 905 Oliver Bldg., Pittsburgh, Pa. Secretary, Guy F. Batchelor.

Natural Gas & Petroleum Association of Canada, Chatham, Ont., Canada. Secretary, S. A. Morse.

Natural Gasoline Association of America, 504 A-B Cosden Bldg., Tulsa, Okla. Secretary, A. V. Bourque.

Nebraska Independent Oil Men's Association, 816-817 Terminal Bldg., Lincoln, Neb. Secretary, C. M. Sutherland.

New Jersey Oil Trade Association, 196 Halsey St., Newark, N. J. Secretary, J. H. Chambers.

New York State Oil Producers Association, Wellsville, N. Y. President, Lewis H. Thornton.

New York State Petroleum Marketers Association, 1201 So. Salina Co., Syracuse, N. Y. Secretary, Benjamin A. Javitz.

North Carolina Independent Oil Jobbers Association, Greensboro, N. C. Secretary-Treasurer, E. M. Brown, Carolina Oil Co., Lincolnton, N. C.

North Central Ohio Petroleum Club, 489 Cherry St., Marion, O.

North Dakota Petroleum Association. Acting head, H. M. Wilson, care International Oil Co., Minot, N. D.

Northwest Independent Oil Association. Secretary, C. H. Brown, care Arro Oil & Refining Co., Lewiston, Mont.

Northwestern Pennsylvania Oil Producers Association, 78 Main St., Bradford, Pa. President, A. Edward Booth.

Ohio Gas & Oil Men's Association, 811 First National Bank Bldg., Columbus, O. Secretary, William H. Thompson.

Ohio Petroleum Marketers Association, 606 Commerce Bldg., Columbus, O. Executive Secretary, W. A. Milne.

Oil Trade Association of Baltimore, Md. Secretary, Arthur B. Gardner, 309 East Falls Ave., Baltimore, Md.

Oil Trade Association of Philadelphia, Inc. Secretary, Howard M. Rogers, 123 Arch St., Philadelphia, Pa.

Oil Trades Association of New York City, Inc., 35 So. William St., New York City. Secretary, Joseph C. Smith.

Oklahoma Oil Jobbers Association, 416 Fidelity National Bank Bldg., Oklahoma City, Okla. Manager, Secretary and Treasurer, Arthur J. McClelland.

Oklahoma Oil Marketers, Inc., P. O. Box 755, Enid, Okla. Secretary, W. W. Blackburne.

Okmulgee District Oil & Gas Association, Okmulgee, Okla. Secretary, Charles I. O'Neill.

Osage Oil & Gas Lessees Association, 505 Cosden Bldg., Tulsa, Okla. Secretary, Harry H. Smith.

Pennsylvania Grade Crude Oil Association, 209 Chambers Bldg., Oil City, Pa. Secretary, R. J. Alexander.

Petroleum Club of Central New York. Secretary, George R. Casey, Crown Oil Co., Syracuse, N. Y.

Petroleum Motor Transport Association. President, Roy F. Fike, Mid-Continent Petroleum Corp., Cosden Bldg., Tulsa, Okla.

Pierce County Independent Gasoline & Oil Dealers Association. Executive Secretary, J. H. Stine, 1009½ Pacific Ave., Tacoma, Wash.

Purchasing Agents Association of Tulsa, 307 So. Cincinnati St., Tulsa, Okla. Secretary-treasurer, H. M. Cosgrove.

Rocky Mountain Independent Oil Men's Association (formerly Colorado Petroleum Club), 411 Exchange Bldg., Denver, Colo. Secretary, A. Oberholtz, Jr.

Rocky Mountain Oil & Gas Association, P. O. Box 1559, Casper, Wyo. Secretary, C. W. Sparr.

Rocky Mountain Oil & Gas Association, Montana Chapter, 222 Ford Bldg., Great Falls, Mont. Secretary, Walter F. Brittan.

South Dakota Independent Oil Jobbers Association, Sioux Falls, S. D. Secretary, F. H. Buehler, care Dacotah Oil Co., Madison, S. D.

Southeastern Missouri Oil Marketers Association. Secretary, E. C. Smith, Kelso Oil Co., Cape Girardeau, Mo.

Southeastern Ohio Oil & Gas Producers Association, Logan O. Secretary, W. L. Franks.

Southern Petroleum Jobbers Association. Secretary, D. C. Patterson, Camden, S. C.

St. Louis Petroleum Club, 1430 So. Vandeventer Ave., St. Louis, Mo. Secretary, R. F. Leinberger, Blackmer Pump Co., St. Louis, Mo.

Springfield Petroleum Club, Secretary, Ross Lock, c/o Lock Bros., Oil Co., Springfield, Ill.

State Executives Club. Secretary, Paul E. Hadlick, Minnesota Petroleum Association, 638 Builders Exchange, Minneapolis, Minn.

Tank Car Association, 1015, 139 N. Clark St., Chicago, Ill. Manager, J. Arthur Kealy.

Technical Club of Oklahoma, 208 Fisher Bldg., Tulsa, Okla. Secretary, R. I. Ginter.

Tennessee Independent Oil Men's Association. Secretary, G. H. Alsup, Jr., care Consumers' Supply Co., Murfreesboro, Tenn.

Texas Independent Oil Men's Association. Secretary, L. A. Greene, care Radio Petroleum Co., Forth Worth, Tex.

Virginia Independent Oil Men's Association, 511 Union Trust Bldg., Petersburg, Va. Secretary, treasurer and field representative, W. M. Eller.

West Virginia Oil and Natural Gas Association, Fairmont, W. Va. Secretary-Treasurer, Edwin Robinson.

West Virginia Oil Marketers Association, 513 Peoples Exchange Bank, Charleston, W. Va. Secretary and Treasurer, D. E. Frierson.

Western Petroleum Refiners Association, 504 Cosden Bldg., Tulsa, Okla. Managing Director, Howard Bennette.

Western Reserve Petroleum Club. President, R. C. Heil, Commercial Oil Co., 2545 E. 83rd St., Cleveland, O.

Wisconsin Independent Oil Jobbers Association. Secretary, J. M. McLaughlin, Bartles-Maguire Oil Co., Milwaukee, Wisc.

Wyoming Petroleum Club. Secretary, G. H. O'Donnell, 847 So. Lincoln St., Casper, Wyo.

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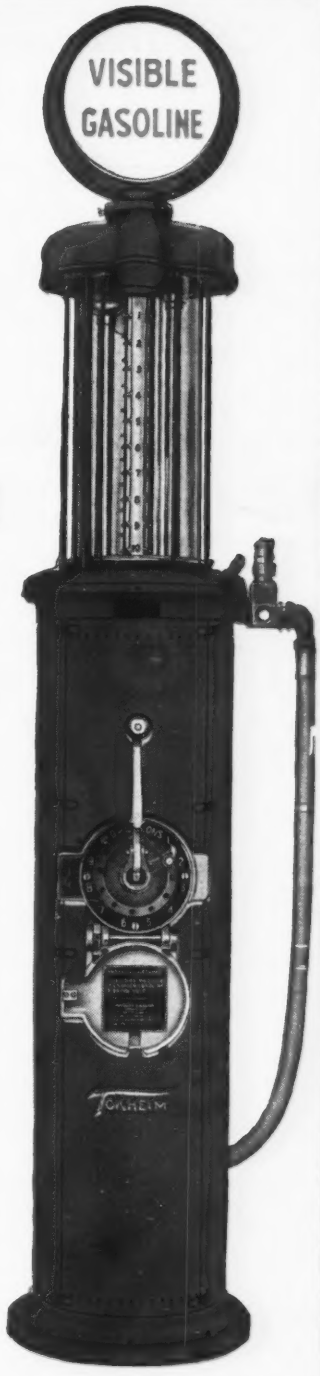

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Visible GASOLINE PUMPS

Our Industry — A Page of Facts and Personalities

National Petroleum News

By Paul Wagner

CHRIS WILLIAMS, president of the Ponca City Gas Distributing Co., and otherwise identified with Marland operations in Oklahoma, has a distinctly individual way of singing the late song hit, "Blue Heaven." When he gets to that part of the song which refers to "baby makes three," he changes it to fit his own situation. The words then become "and our babies three," for it hasn't been so many months past that Williams became the father of triplets.

* * *

WAYNE F. BOWMAN, formerly Gulf Coastal geologist of the Associated Oil Co., has opened consulting offices in the First National Bank building at Houston. The change became effective when the Associated offices were virtually closed at Houston and operations transferred to the jurisdiction of the allied Tidal Oil Co. of Texas at Fort Worth. Mr. Bowman was identified with the geological organization of Rio Bravo Oil Co., subsidiary of the Southern Pacific, before taking up his duties with the Associated.

* * *

THOMPSON & THOMPSON, both having the given name of "Jim," but neither bearing blood relation to the other, are operating in the Rogers county, Okla., territory, near Claremore. They recently obtained production in 9-21-17, where a five-barrel well was completed at a shallow depth.

* * *

GAS found in the Rye test of the Natural Gas & Fuel Corp., near Aberdeen, Miss., is coming from the upper part of the Mississippian series beds, according to W. W. McDonald, chief geologist of this Henry L. Doherty Co. The test came in for 7,000,000 cubic feet daily, with 980 pounds rock pressure, at 2715 feet, or 22 feet in the pay. The well is about 16 miles south of the previously completed Carter gasser, good for 5,000,000 cubic feet daily.

* * *

GEORGE W. PRYOR is now in direct charge of the mapping and drafting department of the Louisiana Oil Refining Corp.'s producing department, under L. S. Harlowe, chief geologist. He succeeds A. R. Jones, recently resigned.

W. H. FRANCIS

THE accompanying picture of W. H. (Bill) Francis, vice president and general counsel of the Magnolia Petroleum Co., Dallas, shows how he gets his genial attitude toward life and things in general. As may be seen from the picture, he got the season's limit on a recent deer hunting trip in west Texas.

Mr. Francis is widely known for his after-dinner speeches at petroleum industry gatherings in north Texas where he delights to "meow his meow." The expression originated at a Fort Worth meeting of the various wildcat committees of the Texas division of the Mid-Continent Oil & Gas Association, where Mr. Francis thus described his remarks.

* * *

J. H. GREER, formerly Smackover field superintendent of the Pure Oil Co., has been transferred to the producing department in Oklahoma, hereafter making headquarters at the Tulsa office.

* * *

WARREN JACKSON, formerly of the Louisiana Oil Refining Corp.'s staff in the Shreveport district, is now with the Southern Crude Oil Purchasing Co., arm of the Pan American group, in the west Texas and New Mexico territory. His position is that of petroleum engineer.

THE purchase of a tri-motored monoplane by The Texas Co., at Houston, is described by Fred T. Manley, southern division sales manager, as primarily for experimental purposes.

"We shall ascertain," he said, "what grades of petroleum products are best suited to the aviation industry through tests with the plane. It also will be used on special occasions to convey executives when a quick trip is necessary."

* * *

S. M. GREENIDGE, research engineer of the Texas Pacific Coal & Oil Co., with headquarters at Thurber, Texas, is recovering from an illness at the Baptist hospital in Fort Worth.

* * *

C. L. MAYHALL, sales manager of the Anderson-Pritchard Oil Corp., Oklahoma City, returned to headquarters in time for the holidays from a trip to New Orleans and intermediate points.

* * *

JESSE J. LEE of the law firm of Kennerly, Williams, Lee & Hill, counsel for Houston Oil Co. of Texas, is the father of a third son, newly arrived.

* * *

WHEN the W-K-M Co., Inc., of Houston, presented a motion picture of its patented pipe cleaning machine at the Chicago meeting of the American Petroleum Institute the showing was in charge of C. S. Campbell, assistant to the president and manager of pipe cleaning machine sales. Mr. Campbell was elated at the reception given the showing, which was the first of its kind ever made before the Institute.

* * *

S. T. CHILDRESS, formerly utility foreman in the producing department of the Rio Bravo Oil Co., Southern Pacific subsidiary, is now assistant superintendent at the Houston offices.

* * *

RALPH JOHNSON, formerly stationed at Abilene, Texas, for Sinclair Oil & Gas Co., has been transferred to Tulsa headquarters, where he is an assistant to Herbert B. Smith, vice president in charge of lands and leasing.

* * *

JACK KENNEDY, in charge of the Oklahoma City land and geological office of the Texas Pacific Coal & Oil Co., spent the holiday season in Fort Worth and west Texas territory.

* * *

J. S. McCATHERN, formerly superintendent of rotary tools for the Pure Oil Co., in the Lake Charles, La., district, has been transferred to the Lake Maracaibo district of Venezuela. Lyle Andrews succeeded him at Lake Charles.

Business World Stable Says Hoover

WASHINGTON, Jan. 3.—Forces of stability are dominant in the business world of this country in a broad sense, as the new year comes in, said Secretary Hoover, of the Department of Commerce, in an annual statement issued at the request of the press. The statement, in part, follows:

It may be said that there is an ample supply of credits at low rates; the somewhat larger stock of goods which were accumulated during the summer are being reduced; there is no consequential speculation in commodities; the crops have been abundant; wages are at a high level; we are recovering from some partial unemployment, especially in the automobile industry.

There is peace in most sections of the labor world except bituminous coal; there is more peace in the international world than at any time since the war; the foreign world is recovering its economic strength and buying power, therefore, our foreign trade is steadily increasing. The phenomena usually accredited as premonitory of a slump are therefore absent.

During the past year there have been important shifts in our own economic world which have an important bearing upon the future. While the average wholesale price of all commodities at about 50 per cent above prewar is today the same as a year ago, yet if we divide them into agricultural and non-agricultural goods, it will be found that the average price of non-agricultural products has fallen in the 12 months from about 60 per cent above pre-war to 51 per cent pre-war; while the average of agricultural products at central markets has risen from about 35 per cent above pre-war to about 53 per cent above pre-war; however, prices on the farm show only a rise of from about 30 per cent above to about 39 per cent above pre-war.

Manufacture and distribution have by savings and diminished profits accommodated themselves to this situation of decreasing prices without reduction in the average level of wages and therefore in the national buying power. But the great extent to which industry has accommodated itself to lower prices by decreased costs makes for a sounder condition for the ensuing year. Despite decreasing prices, production and consumption of manufactured commodities have been maintained upon a high level, as shown by car-loadings of class of goods, which have been about equal to those of last year.

Pennsylvania Oil PLUS

Plus what? —Plus the fact that it is blended from 450 Bright Stock (Sharples Process) refined in ONE Freedom Plant — and from 100% Pennsylvania Crude Neutrals refined in ANOTHER Freedom Plant. Thus, under one supervision, with the one guarantee of a 48 year old refinery, a line of Freedom 100% Pennsylvania Motor Oils is blended to specifications which appeal to discriminating jobbers — a complete line of oils that enable you to build your business and your customers' businesses on repeat order foundations.

Guaranteed 100% PURE PENNSYLVANIA OIL

Permit No. 31

For nearly 50 years, The Freedom Oil Works Company has specialized in the refining and blending of 100% Pennsylvania Oils. In one way, that explains why jobbers the country over come to this concern for their requirements.

Deliveries can be made immediately, in tank cars, compartment tank cars, barrels, or drums.

Write for quotations.

Also available for immediate shipment

450 Bright Stock (Sharples Process) which requires less Neutral to blend to the ordinarily required specifications.

100% Pennsylvania Motor Oils, *blended to your own Specifications*, from Freedom 450 Bright Stock and Freedom 100% Pennsylvania Crude Neutrals.

Freedom Quality Stocks
600 Steam Refined
635 Steam Refined
650 Steam Refined

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58-60 U.S. Motor Gasoline
64-66-375 E. P. Aviation
41-43 W. W. Kerosene
36-38 Straw Distillate
32-36 Gas Oil Uncracked
22-26 Fuel Oil (Cushing or
24-26 Fuel Oil Blackwell)

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Refineries at;
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THE thirty-five years of experience of the Buffalo Meter Company stands behind Niagara Oil Meters.

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New Patents

Dec. 20

Refining

Process and Material for Treating Gasoline and Hydrocarbons—Albert H. Ackerman, Chicago, Ill., assignor to Catalytic Chemical Company. Filed Dec. 14, 1925. No. 1,653,032.

Distillation of Petroleum Oils—Richard W. Hanna, Piedmont, and Richard J. Hanna, Burlingame, Calif., assignors to Standard Oil Co. of California. Filed Oct. 2, 1922. No. 1,653,431.

Spear for Oil-Well Casings or Tubing—Jarrett L. Camerson, Orangefield, Texas, assignor to Evangeline Iron Works, Ltd., Vinton, La. Filed May 10, 1927. No. 1,653,547.

Production

Well Elevator—John Grant, Los Angeles, Calif., assignor to Dunn Manufacturing Co., Oxnard, Calif. Filed March 7, 1923. No. 1,653,095.

Sucker Rod and Plunger Rotor—Summer B. Sargent, Los Angeles, Calif., assignor to Sargent Engineering Corp., Los Angeles, Calif. Filed July 19, 1921. No. 1,653,510.

Rod-Pulling Device—William Holt, Eldorado, Kans., assignor to Peter Gustaf Leonard, West Tulsa, Okla. Filed July 15, 1926. No. 1,653,046.

Jar For Fishing and Drilling Tools—Charles T. Fleming, Taft, Calif., assignor to William J. Hay, Taft, Calif. Filed Dec. 23, 1925. No. 1,653,093.

Jar For Fishing and Drilling Tools—Charles Truman Fleming, Taft, Calif., assignor to William J. Hay, Taft, Calif. Filed Dec. 23, 1925. No. 1,653,094.

Miscellaneous

Production of Fire-Extinguishing Foam—Louis Burgess, Jersey City, N. J., assignor to Standard Oil Development Co. Filed July 10, 1924. No. 1,653,147.

Gas Tip and Process for Producing Carbon Black—Clyde A. Barbour, Jr., Monroe, La. Filed Oct. 8, 1926. No. 1,653,536.

Oil Trademarks for Copyright

The following are trademark applications pertinent to our field pending in the United States Patent office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Barrister Building, Washington, D. C., trade-mark specialists.

As an additional service feature to its readers, this journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering. You may communicate with the Editor of this Department, or send your inquiry direct to the National Trade-Mark Company, stating that you are a reader of this journal.

"STANLUB" No. 255,828. Standard Lubricant Co., Inc., New York City. For lubricating oils.

"SEBA" No. 255,579. Swan-Finch Oil Corp., New York City. For petroleum grease for lubricating purposes.

"PENN EMPIRE" No. 255,976. Empire Oil Works, Inc., Oil City, Pa. For fuel oil, lubricating and illuminating oils, gasoline, and mineral wax.

"EMPIRE OIL WORKS" No. 255,975. Empire Oil Works, Inc., Oil City, Pa. or same as above.

FIGURE OF A JESTER DRESSED IN YELLOW AGAINST A BACKGROUND OF RED OR ORANGE No. 209,927. Lindsay-McMillan Co., Milwaukee, Wis. For lubricating oils and greases, gasoline, benzine, kerosene, cutting oils, and paraffin waxes.

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—and they are Butler's!

Features you'll like

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Both tanks shown above are 600-gallon capacity, semi-rectangular style. They are divided into three compartments. They are made of 12 gauge blue annealed copper steel throughout. They have lift type bumper at rear to protect faucets.

Please note that both of these truck tanks are equipped with Butler steel mountings.

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CLEVELAND: 1302 Ontario Street, North
CINCINNATI: 450 East Pearl Street
DETROIT: 5459 Grand River Avenue
ST. LOUIS: 1621 Pine Street
KANSAS CITY: 13th Street and Eastern Ave.
CHICAGO: 1213 W. Washington Blvd.
SAN ANTONIO: 1401 South Flores Street
HOUSTON: 700 N. San Jacinto Street
EL PASO: 1020 East Overland Street
NEW ORLEANS: 211 South Peters Street
MINNEAPOLIS: 900 Sixth Ave., S. E.
DENVER: 4800 York Street
SAN FRANCISCO: 873 Mills Building
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New Equipment to Improve Plants

Personal Notes of the Manufacturers

National Petroleum News

Macbeth-Evans Glass Co., Charleroi, Pa., recently issued a colorful 16 page catalogue of decorative globes for gasoline service stations, and outdoor exhibits of that character. In advertising globes they have achieved a realistic effect in displaying pictures which include several shades as well as two or three colors.

* * *

Blackhawk Mfg. Co., Milwaukee, Wis., has just added to its line of hydraulic oil power jacks a 75-ton model, weighing 200 pounds which is claimed to be lighter than any other jack of similar capacity. Its collapsed height of 18 inches permits it to go under almost every job. It is equipped with two pumps, a speed pump and power pump.

A feature is the check valve unit, which contains both ball checks and is the heart of the jack. It is easily removed for cleaning by unscrewing the pump.

* * *

J. I. Burgess, formerly of the National Acme Co., Cleveland, O., and more recently sales manager of the National Pipe Products Corp., Rochester, Pa., has been elected president of the Ambridge Tool & Die Mfg. Co., Ambridge, Pa.

* * *

Sheldon Machinery Corp., 15 Park Row, New York City, has issued a booklet on its oil well machinery and equipment specially designed for difficult drilling problems.

Some of the advantages claimed for the Sheldon-Burden rotary drill are safety against high gas pressures; complete drilling equipment (including engine and draw-works) in one light and easily portable unit; can be used interchangeably as a regular rotary or hydraulic feed machine; less fire risk; facilitates drilling in loose formations where caving would cause difficulties; and easily controlled hydraulic feed which enables driller to keep hole straight when a hard formation is encountered at an angle.

The type D drill can be furnished with slow-speed heavy duty rotary or high speed ball bearing rotary with various sizes of gasoline engines or without engine for mounting upon a 5-ton truck, in which case the truck engine and transmission are used to operate the drill.

Accessories to be used with rotary drills as well as the company's own make are also described and illustrated.

Joseph Reid Gas Engine Co., Oil City, Pa., reports that H. A. Platt, assistant superintendent at Oil City, arrived at that city in time to enjoy the Christmas holidays with his family, after an extensive trip through the oil fields of Oklahoma, Kansas and Texas.

* * *

The Lincoln Electric Co., Cleveland, O., has transferred John Van Horne from Atlanta, Ga., to Moline, Ill., where he will be at 514½ Fifteenth St., covering the tri-cities on the sale of Linc-weld and stable-arc welders. Mr. Van Horne will work under the direction of R. D. Malm, western manager at Chicago.

* * *

Merco Nordstrom Valve Co., San Francisco, has made several large single shipments of its lubricated valves within the past 30 days, one of the largest ones being one to a nitrate corporation at Tocopilla, Chile. The order consisted of several hundred valves of various sizes for handling acids. Other large orders have gone out to oil companies at Eagloil, N. J., Houston, Dallas, Casper, Whiting, Ind. and Lockport, Ill.

The company's new plant at Oakland, Cal., is now in full operation. H. S. Shuey, secretary reports.

* * *

Erie City Iron Works, Erie, Pa., has off the press a bulletin on "Some Fundamentals of Water Cooled Furnace Design" by Prof. W. J. Wohlenberg. Charts, illustrations and other data are included.

A leaflet has also been published on the Erie City Vortex furnace which describes a method of firing small water tube boilers and horizontal return tubular boilers with pulverized coal.

Struth Is "Natural Gas" Editor

CINCINNATI, O., Jan. 3.— H. P. Struth, petroleum economist and until recently, associate editor and economist of Oil Trade and Fuel Oil, New York City, has been appointed editor of Natural Gas, the official organ of the Natural Gas Department of the American Gas Association. Mr. Struth succeeds W. Re. Brown. His headquarters will be at 9 W. Fourth St., here. Mr. Struth has been employed in the past by oil and gas companies and has obtained his practical knowledge in the Mid-Continent fields.

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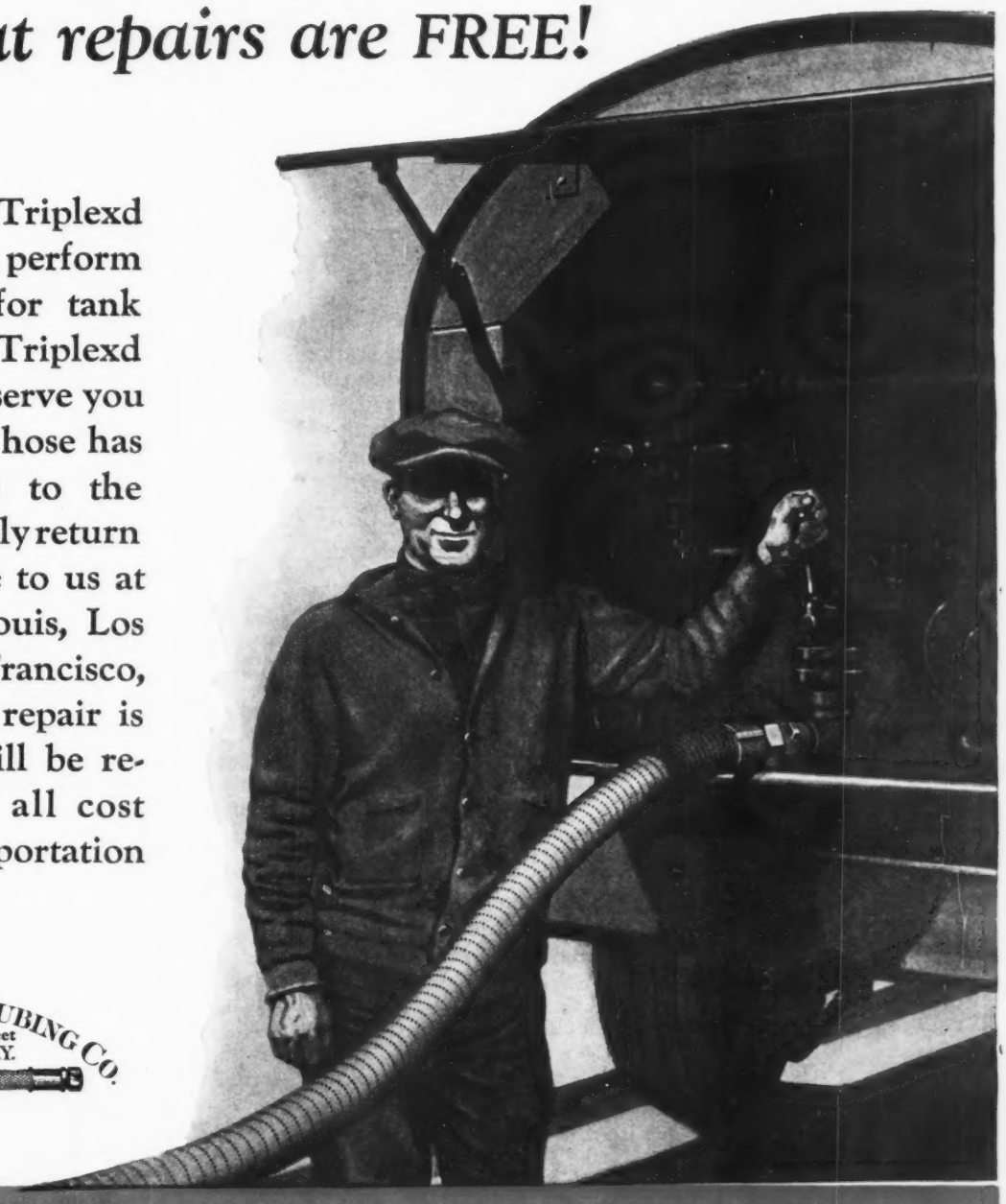

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Old Methods make no Profit

HOW long would a grocer hold your business if, when you asked him for molasses, he said, "You'll have to wait a few minutes while I go into the back room and pump it out of a barrel."

Such methods waste not only his own time but, worse yet, the time of his customers. The modern merchant,—the fellow you like to patronize, topples a can off the shelf and asks, "What else?" He serves you well and makes a profit.

The day is past when a filling station's patronage "comes without calling". Today the fellow who is ready when the motorist drives in,—who has his oil measured out and waiting in Rhodes Dispensers, is the fellow who increases his business and his profit.

JAY B. RHODES COMPANY
Kalamazoo, Michigan

RHODES PRE-FILLED OIL DISPENSERS

"Burning Liquid Fuel"

LEARN real facts which have never been published before on the subject of burning liquid fuel, by W. N. Best, the recognized authority.

Send your order and check for $4 to—

National Petroleum News
1213 W. 3rd Street Cleveland, Ohio

Bring New Customers
and Hold Your Old Ones

ALLISON COUPON BOOKS
Accurate—Compact—Convenient

Popularize the coupon book habit at YOUR filling stations. Sales organizations, truck fleets and individual drivers prefer this plan once they try it. Allison Coupon Books are absolutely accurate. Furnished in stock or special designs. Send for samples and prices.

Allison Coupon Company
Indianapolis, Indiana
Coupon Book Specialists Since 1888

New Stations Building

Beatrice, Neb.—Super-Service Station, of which D. K. Burgess is president, will build station.

Des Moines, Ia.—Sinclair Refining Co. will build filling station.

Wisconsin Rapids, Wis.—Marland Refining Co. will build filling station.

Madison, Wis.—Capital Oil Co. will build filling station.

Minneapolis, Minn.—Nick Giebenhain will build filling station.

Fairmont, Minn.—Elmer J. Carney is erecting filling station.

Allentown, Pa.—Lehigh Valley Tire Co. will install filling station.

Wilmington, N. C.—MacMillan & Cameron will build filling station.

Arkansas City, Kans.—Marland Refining Co. has obtained permit to build super service station.

Medford, Okla.—R. J. Early and William Donnell are completing filling station.

Wheeling, W. Va.—Scharf Bros. will build filling station and garage.

Dalton, Ga.—Gulf Refining Co. will build filling station.

St. Louis Jobbers Open Six Stations

ST. LOUIS, Jan. 3.—Six service stations of the Commonwealth Service Co., recently organized here, are in operation now and approximately 19 more are to be completed by June 1. The company has purchased more than 40 lots in St. Louis.

Complete service is given at these super-stations. The lubricating department checks its work and has a final inspection for all cars serviced. At several stations automobiles will be washed and polished.

In keeping with a construction program of artistic buildings, the stations are built of white tile with checker trim of terra cotta. Two attendants will be at each station so that the gasoline man will not work in the lubricating department.

Hugo Wurdack who has been active in promoting and financing public utility companies for several years, is president of the company. P. M. Gash, formerly with Standard Oil of Indiana, is general sales manager. Maurice Barrett, also formerly in the public utility business, is in charge of engineering, contracting and general management of the company.

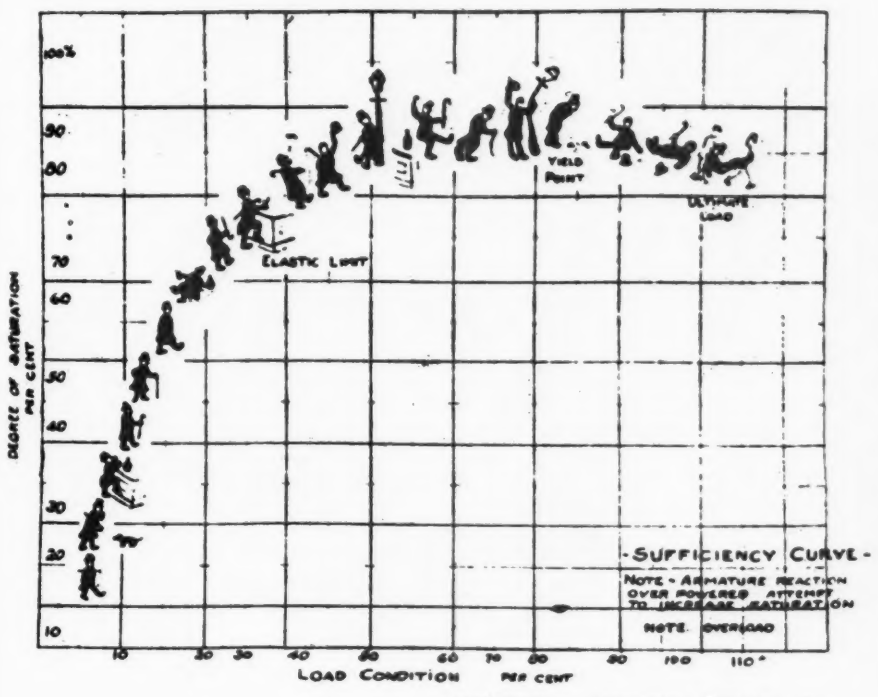
Several national brands of lubricating oil are sold. White Shield is the company's oil brand. The bulk plant is at 4248 Chippewa.

CLEVELAND, Dec. 29.—Net earnings of Cities Service Co. in 12 months ended Nov. 30 were $29,264,796, compared with $20,869,380 in 12 months ended Nov. 30, 1926.

ON THE LAZY BENCH

National Petroleum News

Interesting Statistics, Graphically Presented



LUITWIELER PUMPING ENGINE Co

From the Graver Corp. of California

Here's a Trade Puller For the Gasoline Station to Consider

Herman Ludin, owner of a filling station near Kane, charged with violation of the liquor laws, when put on trial at Smethport stated that competition in his line of business was so keen that he had to offer an inducement to draw trade, so he gave a bottle of beer to every customer who bought gasoline at his place. A fine of $500 and costs and a term of four months in jail was the penalty meted out by Judge J. W. Bouton.—(Tribune Republican, Meadville, Pa.) Contributed by R. P. Boynton, Boynton Service Station Co., Meadville, Pa.

* * *

"See here!" exclaimed the landlord angrily. "When you signed the lease for this flat, you told me you had no children. Yet you moved in with four."

"But they're not mine," expostulated the lease holder. "They're my wife's by her first husband."

—*Skelly News.*

* * *

"How old is Elizabeth?"

"Don't know, but everybody was overcome by the heat from the candles on her last birthday-cake."

—*Skelly News.*

Brown was giving his final bachelor party, and all was going well until a married friend approached him and said:

"Let me congratulate you, old man. I feel sure you will always look back on this day as the happiest in your life."

"Thanks," replied Brown, "but—er—it's tomorrow that I'm getting married."

"Yes," agreed his friend. "I know that."—*Skelly News.*

* * *

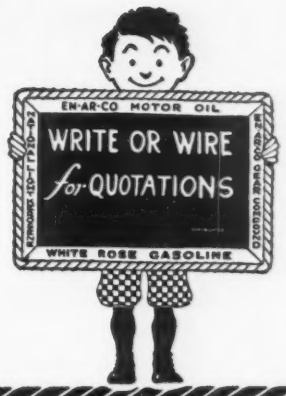
Major Zipp, U. S. A., retired, was in a tearing hurry to get somewhere, as all majors always are. A gang of convicts were engaged in blazing away a cliff, and a huge boulder had rolled into the road, blocking his car.

"Hustle up!" he barked at one of the workers. "Move that rock quick! I'm in a hurry!"

"Hell, mister," retorted the convict mildly. "I've got twenty years to get that rock moved."—*Skelly News.*

* * *

"Now, remember, my dears," said Mother Raccoon to her children, "you must always watch your step, because you have the skin the college boys love to touch!"—*Skelly News.*



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NATIONAL REFINING COMPANY
PETROLEUM PRODUCTS

THREE MODERN REFINERIES:
Marietta, Ohio Refinery
operated on Pennsylvania Crude
Findlay, Ohio Refinery
operated on Ohio Crude
Coffeyville, Kansas Refinery
operated on Midcontinent Crude

National Headquarters
NATIONAL BLDG., CLEVELAND, O.

Special Muleskin Folio

Your Name in Gold FREE

Complete Net $7.50

362K—Special made folio from heavy double weight muleskin in handsome shark grain. Has three pockets, heavy leather straps and handle, good lock, bottom reinforced with steel studs. Inner case contains six 4-oz. bottles, partitioned separately, lined with red velvet. Metal capped corks furnished. Case also contains five grease jars.

Other styles in our FREE Catalog

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Builders of Sales Luggage

614 Delaware, Kansas City, Mo.

Some of the largest Oil Companies in America are standardizing on FRY FLUSHERS for their station equipment

FRY FLUSHER

The Greatest Money Maker You Can Install

Surely the judgment of some of America's foremost oil companies is a pretty clear indication of the value of the Fry Flusher.

Yes—the large oil companies are standardizing on the Fry Flusher. They realize that it fits in with that snappy modern service demanded by the motorists.

They realize also that the Fry Flusher is the only solution to quicker and larger grease profits.

Once you get a customer in the habit of coming to your station for grease service, he will come for gas, oil and every other accessory you sell. The Fry Flusher makes you greater grease profits and helps to sell other profitable lines beside.

Write today for full details

FRY EQUIPMENT CORPORATION, ROCHESTER, PA.
FRY EQUIPMENT COMPANY OF CANADA, LIMITED, TORONTO, CANADA

Refinery - Tank Wagon Markets

National Petroleum News

Mid-Continent Fuels and Distillates Are Steady; Gasolines Lower

Staff Special
TULSA, Dec. 31

A FURTHER decline in the prices of U. S. Motor and lower gravity gasolines, an active contract demand for kerosenes, distillates, gas oil and fuel oils, and an increase in inquiries for natural gasolines marked the last week of 1927 in the Mid-Continent refinery market.

The week was a short one and business was confined mostly to routine matters. Refiners reported a fair volume of orders Tuesday morning but most orders were for contract shipments. Thursday and Friday buying was slightly better as jobbers who had been holding inventories as low as possible, began to order goods to arrive at destination after Jan. 1.

Just before the Christmas holiday the trade here had predicted a comparatively active market this week, but today many expressed the opinion that the buying had not been nearly so heavy as had been expected. Others said they, nevertheless, had had comparatively good business, all products considered.

Exporters remained inactive. A broker late in the week was inquiring for 64-66, 375 end point gasoline in north Texas and Oklahoma, but the goods were to apply on an old order, it was reported.

With most jobber customers asking for high gravity, anti-knock motor fuels, many refiners in the Mid-Continent have quit making low gravity gasolines. Those who are making the heavier gasolines, have found the demand sufficiently strong from customers who do their own blending, to keep prices almost on a level with 58-60 U. S. Motor gasoline. As the price of the latter commodity moved downward this week, refiners also reduced prices of the 450 e.p. gasolines as well as of naphthas.

The price of 58-60 U. S. Motor in Oklahoma moved down to 5.75 cents late in the week. While this price was by no means general the volume of goods moved at it was sufficient to make it a factor in the market. The bulk of goods was reported from Oklahoma plants at 5.875 cents, with several refiners quoting 6 cents, and two or three still holding their quotations at 6.125 cents a gallon.

Virtually the same situation prevailed in north Texas although the refiners in that area have been so busy on export orders they have paid but little attention to domestic business the last few weeks. Competition from the west Texas area also was responsible in part for the reduction in prices in the Wichita Falls district.

In the Louisiana district 58-60 U. S. Motor gasoline today broke the flat price of 6.50 cents which has prevailed for several weeks, and quotations were out at 6.25 to 6.50 cents. Virtually no changes were noted in the Arkansas and Kansas groups.

High gravity gasolines were unchanged in all areas. In Oklahoma the domestic demand was reported good, while in Texas the export orders were still controlling factors with little attempt made to move goods to northern domestic markets.

NEW business for January shipments checked the down trend of natural gasoline prices this week. Inquiries and buying had not developed in sufficient quantity, however, to cause prices to swing upward again. Grade C today was still at its new low price of 3.50 cents in Oklahoma although demand for the commodity in Texas, coupled with the fact that it was somewhat scarcer in that area had caused some sales to be made at 3.625 and 3.75 cents.

Grade A and Grade B have been in better demand than the other grades and have been scarcer. Grade A was around 5.25 cents today, and grade B, when specified, brought 4.25 cents.

Despite considerable pressure on kerosenes, prices rode out the year virtually unchanged from prices a week ago. The 41-43 water white treated product was 4.25 to 4.50 cents a gallon in Oklahoma, with scattered sales of untreated goods at 4.125 cents. No export inquiries were reported but domestic movement was sufficiently good to keep pace with production, several refiners reported.

Distillates are now at or near the peak of their demand and refiners report instructions are coming in rapidly for goods sold months ago on contract. With a cold wave in Standard Oil Co. of Indiana territory, refiners are more optimistic regarding distillates for the next several days, although no indications of price advances have been seen. Shipments continue to outdistance production considerably in virtually all areas.

Gas oils also have been getting a good play with shipments slightly ahead of production and prices were more firmly entrenched at present levels. The low cold test gas oils have been active and the few refiners making these products in the Mid-Continent have had no difficulty in getting at least 0.25 cent more than for the ordinary 32-36 gravity goods.

Low cold test fuel oils also have been in active demand, while other grades of fuels have been moving comparatively good. Numerous inquiries were in the market from industrial users for fuel oils for over January and prices were about in line with spot prices. The entire fuel oil market in Oklahoma, Kansas and Arkansas-Louisiana was characterized as firm, but in north Texas the situation was the reverse. Refiners continue to encounter increasing competition from natural gas and are having to look more and more to the normal Group 3 market for a place to move their fuel oils.

LITTLE has been done on fuel oil contracts for 1928, as far as can be checked in this district. The railroads especially have been reluctant to talk contracts, in view of the present crude oil situation, and most refiners have not been overly anxious to press them. Several refiners the past year had stop clauses in their fuel oil contracts with the railroads, with a minimum of around $1.00 a barrel, whereas since May the price of 24-26 gravity oil in Oklahoma has

(*Continued on page* 117)

THERE IS NO SUBSTITUTE FOR QUALITY

Ahead!

SKELLY Oil Company is pleased that more jobbers are handling Skelly *Refractionated* Gasoline and TAGOLENE Motor Oils than ever before—that the gallonage on these two products is far ahead of a year ago. Yet the Skelly goal is to push farther ahead in 1928. Skelly Oil Company sincerely hopes YOUR business goes ahead in 1928—and Skelly feels it will, if you handle Skelly products. SKELLY OIL COMPANY, Eldorado, Kans.; Tulsa; Omaha; and Minneapolis.

SKELLY

SKELLY *Refractionated* GASOLINE

REFINED BY THE MAKERS OF TAGOLENE MOTOR OIL

EWS

Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, F. O. B. refinery, except where $ is shown

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

PENNSYLVANIA	Prices Jan. 3	Prices Dec. 27	Prices Dec. 19
52-54 Naphtha	8.00 – 8.25	8.00 – 8.25	8.00 – 8.25
54-56 Naphtha	8.25	8.25 – 8.50	8.25 – 8.50
58-60 Gasoline	8.00 – 8.25	8.125– 8.25	8.25 – 8.50
60-62 Str.-run gasoline	8.50 – 9.00	8.50 – 9.00	8.50 – 9.00
64-66 Str.-run gasoline	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75
68-70 Str.-run gas. 350-360 e.p.	10.25 –10.50	10.25 –10.50	10.00 –10.25
OKLAHOMA			
48-50 450 e.p. naphtha	†5.75	†5.75 5.875	†5.875– 6.00
50-52 450 e.p. naphtha	†5.875	†5.875	†5.875– 6.00
56-58 450 e.p. gasoline	**5.75 – 5.875	6.00	6.00
58-60 450 e.p. gasoline	**5.75 – 6.00	6.00	6.00
56-58 U. S. Motor, 437 e.p.	††5.75	††6.00	††6.00
58-60 U. S. Motor, 437 e.p.	5.75 – 6.00	†5.875– 6.00	†6.00
60-62 437 e.p. gasoline	5.875– 6.375	6.00 – 6.375	6.00 – 6.375
60-62 400 e.p. gasoline	6.25 – 6.50	6.25 – 6.625	6.375– 6.625
64-66 390 e.p. gasoline	6.75	6.75	6.75
64-66 375 e.p. gasoline	6.875– 7.125	6.875– 7.125	7.00 – 7.125
68-70 350-360 e.p. gasoline	7.125– 7.375	7.125– 7.50	7.125– 7.50
KANSAS (F. O. B. refinery Kansas destination)			
58-60 U. S. Motor 437 e.p.	6.25 – 6.375	6.25 – 6.375	6.25 – 6.375
60-62 400 e.p. gasoline	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00
64-66 375 e.p. gasoline	7.375– 7.50	7.375– 7.50	7.375– 7.50
NORTH TEXAS			
48-52 450 e.p. naphtha	†5.75	†6.00	†6.00
56-58 450 e.p. gasoline	†5.75	5.875	5.875
58-60 450 e.p. gasoline	5.75	5.875	5.875
58-60 U. S. Motor 437 e.p.	†5.75 – 6.00	†5.875– 6.00	6.00
60-62 400 e.p. gasoline	6.125– 6.375	6.25 – 6.375	6.375
64-66 390 e.p. gasoline	6.625– 6.75	6.625– 6.75	6.625– 6.75
64-66 375 e.p. gasoline	6.875– 7.00	6.875– 7.00	6.875– 7.00
68-70 350-360 e.p. gasoline	7.125– 7.25	7.125– 7.25	7.125– 7.25
NORTH LOUISIANA (For Louisiana and differential territory destination)			
58-60 U. S. Motor gasoline	6.25 – 6.50	6.50	6.50
ARKANSAS (For Arkansas intrastate shipment)			
56-58 450 e.p. gasoline	6.25	6.25	6.25
58-60 450 e.p. gasoline	6.25	6.25	6.25
58-60 U. S. Motor 437 e.p.	6.50	6.50	6.50
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
58-60 U. S. Motor 437 e.p.	**6.25	**6.375	**6.375
CALIFORNIA			
*54-58 U.S. Motor 437 e.p.	7.00 – 8.50	7.00 – 8.50	7.00 – 8.00
*58-61 U.S. Motor 437 e.p.	8.00 – 9.50	8.00 – 9.50	7.50 – 9.00
*42-45 Eng. dis. 445-480 e.p.	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00

*2c tax to be added if used in state.

NATURAL GASOLINE

(Note: End point of all grades, not over 375° F. Since Oct. 1, 1927 all naturals must pass corrosion test.)

OKLAHOMA			
Grade AA, 80-87.9, 90% Recovery	†4.875– 5.00	†4.875– 5.00	†4.875– 5.00
Grade A, 72-79.9, 90% Recovery	†5.25	†5.25	†5.25 – 5.375
Grade BB, 84-92, 85% Recovery	†4.00 – 4.25	†4.00 – 4.125	†4.125
Grade B, 76-83.9, 85% Recovery	†4.00 – 4.25	†4.00 – 4.125	†4.125
Grade C, 80-92, 78% Recovery	†3.50	†3.50	†3.75 – 3.875
NORTH TEXAS (F. O. B. Breckenridge)			
Grade AA, 80-87.9, 90% Recovery	†4.875– 5.00	†4.875– 5.00	†4.875– 5.00
Grade A, 72-79.9, 90% Recovery	†5.25	†5.25	†5.25 – 5.375
Grade BB, 84-92, 85% Recovery	†4.00 – 4.25	†4.00 – 4.125	†4.125
Grade B, 76-83.9, 85% Recovery	†4.00 – 4.25	†4.00 – 4.125	†4.125
Grade C, 80-92, 78% Recovery	†3.50 – 3.625	†3.50	†3.875
NORTH LOUISIANA (F. O. B. Monroe District)			
Grade AA	†5.50	†5.50	†5.50
Grade BB	†5.00	†5.00	†5.00
Grade C	†4.50	†4.50	†4.50
CALIFORNIA			
75-85, 375-390 e.p. blend.	9.00 –10.00	9.00 –10.00	9.00 –10.00

MOTOR FUEL BLENDS

PENNSYLVANIA			
68-70 Blend 437 e.p.	Prices	.....	.....
64-66 Blend 437 e.p.	temporarily	.....	.....
60-62 Blend 437 e.p.	discontinued	.....	.....
OKLAHOMA			
64-66 Blend 437 e.p.	**5.75 – 6.00	**5.875– 6.00	**6.00

BURNING OILS

PENNSYLVANIA			
45 w.w. kerosene	6.25 – 6.75	6.50 – 6.75	6.50 – 6.625
46 w.w. kerosene	6.625– 7.00	6.75 – 7.00	6.875– 7.25
47 w.w. kerosene	7.00 – 7.25	7.00 – 7.50	7.25 – 7.50
OKLAHOMA			
41-43 w.w. kerosene	4.25 – 4.50	4.25 – 4.50	4.375– 4.50
42-44 w.w. kerosene	4.75 – 4.875	4.75 – 4.875	4.75 – 4.875
KANSAS (F. O. B. refinery Kansas destination)			
41-43 w.w. kerosene	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
42-44 w.w. kerosene	5.625– 5.75	5.625– 5.75	5.625– 5.75
NORTH TEXAS			
40-42 w.w. kerosene	†4.25	†4.25	†4.25
41-43 w.w. kerosene	4.25 – 4.375	†4.375	†4.375
NORTH LOUISIANA (For Louisiana and differential territory destination)			
41-43 w.w. kerosene	5.00	5.00	5.00
ARKANSAS (For intrastate shipment only)			
42-44 kerosene	5.25	5.25	5.25
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
42-44 kerosene	5.00	5.00	5.00
CALIFORNIA			
38-40 w.w. kerosene	5.00 – 5.50	5.00 – 5.50	5.00 – 5.50

NEUTRAL OIL

PENNSYLVANIA Vis.	(Viscosity at 70°F.)		
200 No. 3 Assoc. Filt.	32.00 –34.00	32.00 –34.00	32.00 –33.50
180 No. 3 Assoc. Filt.	30.00 –32.00	30.00 –32.00	29.00 –31.00
150 No. 3 Assoc. Filt.	26.25 –27.50	26.25 –27.50	26.25 –28.00
	(Non Viscous)		
34 Grav. 330-340 Flash	7.25 – 7.50	7.25 – 7.75	7.25 – 7.75
36 Min. Neut. 300-305 Flash	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
OKLAHOMA			
Vis. Color	(Viscosity at 100°F.)		
100—No. 2	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
150—No. 3	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
150—No. 4	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
180—No. 3	9.00 –10.00	9.00 –10.00	9.00 –10.00
180—No. 4	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
180—No. 5	9.25 – 9.75	9.25 – 9.75	9.25 – 9.75
200—No. 3	9.50 –11.00	9.50 –11.00	9.50 –11.00
200—No. 4	9.50 –10.75	9.50 –10.75	9.50 –10.75
200—No. 5	8.50 –10.50	8.50 –10.50	8.50 –10.50
220—No. 3	12.50 –13.50	12.50 –13.50	12.50 –13.50
220—No. 4	12.25 –12.50	12.25 –12.50	12.25 –12.50
220—No. 5	11.50 –12.00	11.50 –12.00	11.50 –12.00
240—No. 3	14.00	14.00	14.00
240—No. 4	13.25 –13.50	13.25 –13.50	13.25 –13.50
240—No. 5	12.00 –13.00	12.00 –13.00	12.00 –13.00
280—No. 3	15.50 –16.50	15.50 –16.50	15.50 –16.50
280—No. 4	15.25	15.25	15.25
280—No. 5	14.00 –15.00	14.00 –15.00	14.00 –15.00
300—No. 5-6	17.00	17.00	17.00
GULF COASTAL			
Vis. Color	(Viscosity at 100° F., pour test 0)		
100—No. 2 Unfilt. Pale	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
200—No. 3 Unfilt. Pale	9.00 –10.00	9.00 – 9.50	9.00 – 9.50
300—No. 3 Unfilt. Pale	10.00 –11.00	10.00 –10.50	10.00 –10.50
500—No. 3½ Unfilt. Pale	12.00 –13.00	11.50 –12.00	12.00 –12.50
750—No. 4 Unfilt. Pale	14.00 –15.00	13.50 –14.00	14.00 –14.50
200—No. 5½ Red Oil	7.00 – 8.00	7.50 – 8.00	7.50 – 8.00
300—No. 5½ Red Oil	8.00 – 9.00	8.50 – 9.00	8.50 – 9.00
500—No. 6 Red Oil	9.50 –10.50	10.00 –10.50	10.00 –10.50
750—No. 6 Red Oil	12.00 –13.00	12.50 –13.00	12.50 –13.00
CALIFORNIA			
Vis. Color	(Viscosity at 100°F.)		
100—No. 2	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
100—No. 3	7.50 – 8.00	7.50 – 8.00	7.50 – 8.00
200—No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
300—No. 3	10.50 –11.00	10.50 –11.00	10.50 –11.00
450—No. 3-3½	13.00 –13.50	13.00 –13.50	13.00 –13.50
550—No. 3-3½	14.50 –15.00	14.50 –15.00	14.50 –15.00
600—No. 3-3½	15.00 –15.50	15.00 –15.50	15.00 –15.50
100—No. 5	6.50	6.50	6.50
200—No. 5	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
300—No. 5	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
400—No. 5	11.00 –11.50	11.00 –11.50	11.00 –11.50
500—No. 5	11.00 –11.50	11.00 –11.50	11.00 –11.50
600—No. 5	12.00 –12.50	12.00 –12.50	12.00 –12.50
700—No. 7	14.00 –14.50	14.00 –14.50	14.00 –14.50

CYLINDER STOCKS

OKLAHOMA			
190-200 Vis. at 210° Brt. St.	31.00 –32.00	31.00 –32.00	31.00 –32.00
150-160 Vis. at 210° Brt. St.	23.00 –26.00	23.00 –26.00	23.00 –26.00
600 E St. 140-150 Vis.-210°	17.00 –18.00	17.00 –18.00	17.00 –18.00
600 St. Ref. Olive Green	9.00 –10.00	9.00 –10.00	9.00 –10.00
600 St. Ref. Dark Green	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
Black Oil	5.00	5.00	5.00
PENNSYLVANIA	(1-inch Immersion Test)		
600 Steam Refined	9.50 –10.50	9.50 –10.50	9.50 –10.25
650 Steam Refined	11.50 –12.50	11.50 –12.50	11.50 –12.50
600 Flash	16.00 –16.50	16.00 –16.50	16.00 –16.50
625 Flash	27.00 –27.50	27.00 –28.00	27.00 –28.00
600 Warren E	17.00 –19.00	17.00 –19.00	17.00 –19.00
600 Oil City E	15.50 –16.50	15.50 –16.50	15.50 –16.50
600 D Filtered	24.50 –25.50	24.50 –25.50	24.50 –25.50
Cold Test Stock, 40-50 p. p., 140-150 vis. at 210°, 540-550 flash, No. 8 color	28.50 –30.00	28.50 –30.00	30.00 –31.00
40-50 p.p., 140-150 vis. at 210, 540-550 flash, No. 6-6½ color diluted	27.00 –28.00	27.00 –28.00	27.00 –28.00

(Note—Prices of total immersion test goods average 1 to 3 cents per gallon higher)

†PRICES NOMINAL ††ONLY ONE REFINER QUOTING *QUOTATIONS ONLY **REPRESENTS BOTH SALES AND QUOTATIONS

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Prices
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–12.50
–16.50
–28.00
–19.00
–16.50
–25.50

–31.00

–28.00
per gallon
IONS

SAVE
REPAINTING—
clean with OAKITE

CLEAN, good-looking storage tanks are a business asset.

But instead of repainting, many oil concerns have reduced substantially their repainting costs by cleaning equipment the Oakite way. For Oakite Materials remove every bit of discoloration, oil, dirt and weather stains. Makes old paint look like new.

Tell us your problems or write for flooklet. No obligation.

Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada

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Industrial Cleaning Materials and Methods

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BUILDING FOUND IN OUR NEW

HANDBOOK OF SERVICE STATION DESIGNS

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J. R. DOELKER CO.
898 Ingleside Ave. Columbus, Ohio.

A LUMBER WAGON AND A ROLLS-ROYCE

Are somewhat different and yet alike, inasmuch as they both have four wheels. The same holds true in the difference between the requirements of a gasoline tank of the old fashioned wagon delivery and the modern bus chassis. Brown Certified Tanks are custom built for the particular chassis for which they are intended. We are specialists in this line and ask that you let us figure on your requirements.

Speed with Safety

BROWN SHEET IRON & STEEL CO.

964 Berry Ave. **St. Paul, Minn.**

DON'T DELAY—SIGN THE COUPON AND LET US KNOW WHAT YOU WILL NEED.

Check Items on which you want prices.

Complete Bulk Station.....Number of Tanks.....Size.....

Filling Station Tanks.....Size.....Pumps.....

Truck Tanks.....Size.....Compts.....

Other Equipment.....

Name.....Address.....

Refinery Markets on Wax and Heavy Oil Products

Prices given below are in cents per gallon, F. O. B. refinery, except where $ is shown

(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

WAX

PENNSYLVANIA	Prices Jan. 3	Prices Dec. 27	Prices Dec. 19
Per Pound, New York			
122-124 white crude scale	3.00	3.00	2.75 – 3.00
124-126 white crude scale	3.00	3.00	3.00
OKLAHOMA			
**124-126 Semi-refined..	2.50 – 2.75	2.375– 2.625	2.375– 2.625
CALIFORNIA			
White crude scale, per pound, ton lots.....	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50

FUEL OIL

PENNSYLVANIA			
36-40 fuel oil.....	4.50 – 4.75	4.50 – 4.75	4.50 – 4.75
30-34 fuel oil.....	4.625– 4.75	4.625– 4.75	4.625– 4.75
28-32 fuel oil.....	4.625– 4.75	4.625– 4.75	4.625– 4.75
OKLAHOMA			
38-40 straw distillate.....	3.25 – 3.375	3.25 – 3.375	3.25 – 3.375
36-38 straw distillate.....	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125
*32-36 gas oil, straw.....	†2.50	†2.50	†2.50
*32-36 dark gas oil.....	2.375– 2.50	2.375– 2.50	2.375– 2.50
28-30 fuel oil (in bbls.)...	$0.925– 0.975	$0.925– 0.975	$0.925– 0.975
26-28 fuel oil (in bbls.)...	$0.85 – 0.90	$0.85 – 0.90	$0.85 – 0.90
24-26 fuel oil (in bbls.)...	**$0.80	**$0.80	**$0.80
22-26 fuel oil (in bbls.)...	**$0.75– 0.775	**$0.75– 0.775	**$0.75– 0.775
18-22 fuel oil (in bbls.)...	**$0.70– 0.725	**$0.70– 0.725	**$0.70– 0.725
16-18 fuel oil (in bbls.)...	**$0.70	**$0.70	**$0.70
14-16 fuel oil (in bbls.)...	**$0.70	**$0.70	**$0.70

*Zero cold test low flash goods sell for ¼ cent more per gallon.
Zero cold test fuel oils sell for 5 to 15 cents more per bbl.

KANSAS (F. O. B. refinery Kansas destination.)			
38-40 straw distillate.....	3.50 – 3.75	3.50 – 3.75	3.50 – 3.75
36-38 straw distillate.....	3.25	3.25	3.25
32-36 gas oil.....	2.75 – 2.875	2.75 – 2.875	2.75 – 2.875
24-26 fuel oil	*$0.90 – 0.95	*$0.90 – 0.95	*$0.90 – 0.95
18-22 fuel oil.....	*$0.85	*$0.85	*$0.85
NORTH TEXAS			
38-40 straw distillate.....	3.125– 3.25	3.00 – 3.25	3.00 – 3.25
32-36 gas oil, cracked....	2.25	2.25	2.25
32-36 gas oil, uncracked..	2.25 – 2.375	2.25 – 2.375	2.25 – 2.375
24-26 fuel oil (in bbls.)...	$0.70	$0.725– 0.75	$0.75

GULF COASTAL	Prices Jan. 3	Prices Dec. 27	Prices Dec. 19
Fuel (in bbls.).....	$1.40 – 1.50	$1.40 –$1.50	$1.50 – $1.55
Gas oil.....	4.375– 4.50	4.375– 4.50	4.375– 4.50
NORTH LOUISIANA (For Louisiana and differential territory destination)			
32-36 gas oil, dark.....	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125
32-36 gas oil, straw.....	3.125– 3.25	3.125– 3.25	3.125– 3.25
16-20 fuel oil (in bbls.)...	$1.00	$1.00	$1.00
ARKANSAS (For Arkansas intrastate shipment only)			
32-36 gas oil, straw.....	3.25 – 3.50	3.25 – 3.50	3.25 – 3.50
32-36 gas oil.....	3.00	3.00	3.00
28-32 gas oil.....	2.75 – 3.00	2.75 – 3.00	2.75 – 3.00
ARKANSAS (F. O. B. Arkansas refineries for interstate shipment)			
28-32 gas oil.....	2.75	2.75	2.75
Smackover crude fuel....	$0.975– 1.00	$0.975– 1.00	$0.975– 1.00
CALIFORNIA (F. O. B. San Joaquin Valley. At San Francisco, 4c per bbl. more)			
14-18 fuel oil (in bbls.)...	$0.60 – 0.75	$0.60 –$0.75	$0.60 –$0.75
14-18 Bunker oil (in bbls.)	$0.80 – 1.00	$0.80 –$1.00	$0.80 –$1.00
30-34 gas oil (in bbls.)...	$1.05 – 1.10	$1.05 –$1.10	$1.05 –$1.10
27 Plus Diesel oil (in bbls.)	$0.90 – 1.00	$0.90 –$1.00	$0.85 –$1.00

PETROLATUMS

PENNSYLVANIA (In cents per pound in tank cars; in barrels, in car lots ¾c per pound more.)			
Snow White.....	8.875	9.25	9.25
Lily White.....	7.875	8.25	8.25
Cream White.....	6.875	7.25	7.25
Light Amber.....	3.875	5.50	5.50
Amber.....	3.50	4.50	4.50
Red.....	3.25	3.75	3.75
Green No. 5 color.....	2.625	3.50	3.50

**PETROLEUM COKE

(Per ton in car lots)

Lump.....	$5	$5	$5
Still run.....	$3	$3	$3
Breeze.....	$2	$2	$2

†PRICES NOMINAL ††ONLY ONE REFINER QUOTING *QUOTATIONS ONLY **REPRESENTS BOTH SALES AND QUOTATIONS

(*Continued from Page* 113)

been under $1.00, and the average for the entire year has been 98.8 cents a barrel.

Movement of Oklahoma neutral oils and cylinder stocks has been comparatively good this week with no changes in prices.

Inquiries have been more numerous for a week or 10 days for wax and offers have been received up to 2.75 cents a pound. The prevailing prices today were 2.50 to 3.75 cents for 124-126 white crude scale goods, with odd sales reported for over January up to 3 cents a pound. Reports from eastern markets indicate the wax situation has been improving sufficiently to give the Mid-Continent refiners a more competitive quotation basis.

Report Midwest Buys Station

CHICAGO, Dec. 31.—It was unofficially reported in Chicago this week that Midwest Refining Co., Denver, subsidiary of Standard Oil Co. of Indiana, had bought the properties of the Arrow Oil & Refining Co., Lewistown, Mont., consisting of three bulk and 45 filling stations. It was rumored also that a similar deal was pending between Midwest and Arrow Oil Co., Cheyenne, Wyo. Local representatives say Midwest will not retail under its own name.

Court Refuses to Order Price Data Revelation

CHICAGO, Dec. 31.—An oil marketing company cannot be haled into court as a witness to make an exhibit of its general price structure to settle an argument in which it is not interested, a Colorado trial court has decided. Judge Henry Bray of the district court in Denver made the ruling in support of the contention of Charles Brock, special counsel for Continental Oil Co.

The ruling was in the suit of the Denver Union Oil Co., headed by Harry J. Nance, against the Advanced Petroleum Corp., Chicago, carload marketers. Mr. Nance had contracted to buy gasoline from Advanced at a stipulated figure below the tank wagon price in his territory, in which the Continental Oil Co.'s prices are followed.

Advanced contended that the tank wagon price as posted by Continental was the official tank wagon price, the one contemplated in the marginal contract with the Denver jobber, and the basis upon which collection should be made for gasoline shipped to the Denver Union.

Mr. Nance contended that price war conditions existed; that Continental as well as other marketers were selling below the posted tank wagon price; that more gasoline was being sold below the posted price than at it, and that the actual, not the posted, tank wagon price should be used in computing the price Advanced should receive from him for goods shipped on contract.

Oil men all over the country were watching the case. They expected a court ruling that would define a tank wagon price for contract purposes. That decision did not come because the case ended when Continental declined to make public its prices unless the court so ordered, and Continental's attorneys persuaded the court that it had no right to order the company to submit its prices in a case in which it was not a party.

When the case was dismissed the litigants reached an agreement out of court.

EVANSVILLE, Ind., Dec. 31.—The oil distributing firm of Fisher Brothers, operating eight filling stations in Evansville has completed a bulk storage station and is handling the products of Lincoln Refining Co., Robinson, Ill.

Prices
Dec. 19
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Chicago Market Quiet as Buyers Delay Until After Jan. 1

Staff Special
CHICAGO, Dec. 31

BUSINESS was quiet this week in the Chicago resale market. Jobbers seemed reluctant to buy more than enough gasoline to fill their immediate needs and consequently movement of this commodity was small. Some of the trade reported they had received numerous inquiries from industrial concerns for their January requirements of fuel and gas oils but others reported few inquiries and said it looked like industrials had either filled their requirements or were waiting until after Jan. 1 to buy.

The Chicago postoffice gasoline contract for the first quarter of 1928 which amounts to around 220,000 gallons of U. S. Motor gasoline to be delivered as needed, was awarded to the Seneca Petroleum Co. of Chicago at 0.125 cent below the average tank car market price, date of delivery, plus 0.5 cent handling charge. The contract fixes a maximum price of 6.375 cents, f.o.b. Group 3 as compared with a maximum of 6.625 cents for the last quarter of 1927. Five firms bid and all five were within 0.125 cent of each other.

Several of the trade reported a fair business in 58-60 U. S. Motor gasoline, but most sellers said they had done little business. Most shipping instructions were received on contract goods. U. S. Motor opened the week at 5.75 to 6 cents. Commencing Wednesday and continuing throughout the week the majority of sales were made at 5.625 to 6 cents. Most sellers were quoting 5.75 cents.

Movement of high test gasolines was fair. Considerably more sales were reported of the higher gravities than of U. S. Motor gasoline. The 60-62, 437 e.p. sold all week at 6 to 6.25 cents with some sales at 5.875 cents. The same gravity goods with a 400 end point moved mostly at 6.50 to 6.625 cents. Movement of 64-66, 375 e.p. gasoline was mostly at 6.875 to 7 cents.

Little demand was reported for kerosene. Goods were more freely offered than for some time and prices were fractionally lower after Wednesday. Water white 41-43 sold at 4.25 to 4.50 cents most of the week after opening Tuesday at 4.375 to 4.50 cents.

Steady movement of low cold test distillate was reported by most of the trade. Several sellers reported better movement following the fall in temperature and snow Friday. Sales of 38-40 straw distillate continued mostly at 3.25 to 3.375 cents with some sales reported at 3.50 cents for choice material.

Gas oils with a low flash and low cold test continued in good demand, especially late in the week, the trade reported. The 32-36 ordinary dark goods continued to move mostly at 2.50 cents, although sales were reported both above and below. Like gravity goods but with a zero cold test sold all week at 2.875 to 3 cents. Straw zero 32-36 gas oil moved mostly at 3.125 to 3.25 cents.

Domestic demand for fuel oils was good this week especially on the low cold test goods. Several sellers reported better business Friday and Saturday, saying jobbers were ordering fuel to cover their pre-holiday deliveries. Prices of all grades were generally unchanged. The 28-30 fuel sold mostly at $1.00 to $1.05 with sales also reported at $1.075. Fuel of 24-26 gravity continued to sell at $0.80 to $0.85 and of 22-26 gravity at $0.80 to $0.825. The 18-22 fuel oil moved mostly at $0.775 to $0.80. Several sellers reported that they were quoting $0.85 as their low for all zero cold test fuel oils above 18-22 gravity. Quotations on Smackover crude fuel remained at $1.00 to $1.025 although some goods was quoted at $0.975.

Abnormally cold weather at beginning of the week followed by rising temperatures at middle of week is the official forecast for Standard of Indiana territory. It will be generally fair the first half of the week followed by occasional periods of precipitation.

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OILGRAM
Petroleum Markets-Every Day

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CLEVELAND—722 Penton Bldg.

Week's Price Changes Tank Wagon Markets

Gasoline Changes

Standard of Kentucky—T.w. and s.s. prices gasoline reduced 3 cents, Montgomery, to 16 cents and 19 cents respectively, including 4 cent state tax, **Dec. 24.**

T.w. and s.s. prices gasoline reduced 3 cents, Macon, to 16 cents and 19 cents respectively, including 4 cent state tax, **Dec. 22.**

* * *

Continental Oil—T.w. price gasoline advanced 1 cent, s.s. prices 3 cents, Pueblo, to 16 cents and 18 cents respectively, including 3 cent tax, **Dec. 31.**

Kerosene Changes

Standard of Kentucky—Kerosene reduced 1 cent, Clarksdale, to 11.5 cents, Dec. 22. Kerosene reduced 1 cent, Miami, to 14.5 cents, and Pensacola and Tampa to 13 cents, Dec. 21. Kerosene reduced 1 cent, Birmingham, Mobile and Montgomery, **Dec. 15**, making new t.w. prices 14.5 cents, 14 cents and 15.5 cents respectively.

Gulf Coast Lube Prices Higher

Staff Special

HOUSTON, Jan. 3.—The turn of the year finds Gulf Coastal lubricant markets stiffened. Two Houston district plants are out of the operating picture since the currently announced shut-down of the Keen & Woolf Oil Co.'s ship channel works and the recent receivership proceedings affecting the Galena Signal Oil Co. of Texas. Both companies are selling accumulated stocks of several grades of lubricants but are out of the manufacturing picture for an indefinite time in the future.

Other Gulf Coastal manufacturers have been able, in some cases, to get their prices up a half cent a gallon; and in other instances the market reflects firmer tendencies at unchanged price levels. Colder weather also is bringing about better demand from jobbers.

Tank Wagon, Service Station Markets for Gasoline and Kerosene In United States Territories and Canada

(As posted by principal marketing companies)

(OIL PRICE HANDBOOK has t.w. and s.s. markets for whole year arranged for quick reference)

These Prices In Effect January 2, 1928

S.O. NEW JERSEY TERRITORY

	Gasoline Total			Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Atlantic City, N. J.	16	2	18	20	14
Newark, N. J.	16	2	18	20	14
Annapolis, Md.	16	4	20	23	12
Baltimore, Md.	16	4	20	23	10
Cumberland, Md.	16	4	20	23	14
Washington, D. C.	16	2	18	21	12
Danville, Va.	16	4½	20.5	*	14
Norfolk, Va.	16	4½	20.5	23.5	12
Richmond, Va.	14	4½	18.5	21.5	14
Roanoke, Va.	16	4½	20.5	23.5	14
Petersburg, Va.	16	4½	20.5	23.5	14
Charleston, W. Va.	16	4	20	23	14
Keyser, W. Va.	16	4	20	*	14
Parkersburg, W. Va.	13	4	17	20	14
Wheeling, W. Va.	16	4	20	23	14
Charlotte, N. C.	16	4	20	23	14
Hickory, N. C.	16	4	20	23	14
Mt. Airy, N. C.	16	4	20	23	14
Salisbury, N. C.	16	4	20	23	14
Charleston, S. C.	15	5	20	23	14
Columbia, S. C.	15	5	20	23	14

*Dealers set own prices. S. O. New Jersey does not operate station.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

*New York City	17	0	17	21	15
Albany, N. Y.	13	0	13	15	15
Buffalo, N. Y.	15	0	15	18	14
†Rochester, N. Y.	13	0	13	16	13
Syracuse, N. Y.	15	0	15	15	15
Boston, Mass.	17	0	17	18	15
Augusta, Me.	17	4	21	23	15
Manchester, N. H.	17	3	20	22	15
Burlington, Vt.	17	3	20	22	15

*In steel barrels.

†It is reported that S. O. New York is selling a second grade of gasoline at Rochester, 4c below the above posted prices which apply on its Socony grade.

ATLANTIC REFINING

Pittsburgh, Pa.	16	*	16	*22	14
Philadelphia, Pa.	15	*	15	*21	14
Allentown, Pa.	16	*	16	*22	14
Erie, Pa.	12	*	12	*18	14
Scranton, Pa.	16	*	16	*22	14
Altoona, Pa.	16	*	16	*22	14
Dover, Del.	16	3	19	22	14
Wilmington, Del.	16	3	19	22	14
Providence, R. I.	17	2	19	19	15
Boston, Mass.	17	0	17	17	15
Springfield, Mass.	18	0	18	18	15
Worcester, Mass.	17	0	17	17	15
Hartford, Conn.	18	2	20	20	15
New Haven, Conn.	18	2	20	20	15

*3-cent state tax is collected by retail dealer and paid by him directly to state.

S. O. KENTUCKY

Lexington, Ky.	13	5	18	21	15.5
Louisville, Ky.	13	5	18	21	15
Covington, Ky.	14	5	19	22	15.5
Carbondale, Miss.	13	4	17	20	11.5
Gulfport, Miss.	††14.5	4	††18.5	21.5	14
Jackson, Miss.	13	4	17	20	13.5
Natchez, Miss.	12.5	4	16.5	19.5	14
Vicksburg, Miss.	12.5	4	16.5	19.5	14
Birmingham, Ala.‡	14	4	18	21	14.5
Mobile, Ala.‡	13	4	17	20	14
Montgomery, Ala.*‡	12	4	16	19	15.5
Atlanta, Ga.	13	4	17	19	†14
Augusta, Ga.	15	4	19	22	†16.5
Macon, Ga.	12	4	16	19	†13.5
Savannah, Ga.	13	4	17	19	†14.5
Jacksonville, Fla.°	13	5	18	21	11.5
Miami, Fla.°	15	5	20	23	14.5
Tampa, Fla.°	13	5	18	21	13
Pensacola, Fla.***	14	5	**19	22	13

*Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

‡Alabama gasoline prices include 1/40 of 1c inspection fee, effective Oct. 1, 1927.

†Georgia kerosene prices include 1c state tax.

°Florida gasoline prices include ⅓c inspection fee.

**Both tank wagon prices include 1c city tax at Pensacola, which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

S. O. INDIANA

	Gasoline Total			Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Chicago, Ill.	14	2	16	18	12
Decatur, Ill.	11.5	2	13.5	15.5	12.1
E. St. Louis, Ill.	13.1	2	15.1	17.35	11.2
Joliet, Ill.	14.4	2	16.4	18.4	12.3
Peoria, Ill.	10	2	12	12	12.1
Quincy, Ill.	14.2	2	16.2	18.2	11.9
Indianapolis, Ind.	11.2	3	14.2	15.2	13.2
Evansville, Ind.	14	3	17	19	13
South Bend, Ind.	14.2	3	17.4	17.4	13.4
Detroit, Mich.	12.8	3	15.8	17.8	13.7
Grand Rapids, Mich.	11	3	14	16	13.6
Saginaw, Mich.	14.9	3	17.9	19.9	13.8
Green Bay, Wis.	14.6	2	16.6	18.6	12.4
Madison, Wis.	14.3	2	16.3	18.3	12.1
Milwaukee, Wis.	14.1	2	16.1	18.1	11.9
La Crosse, Wis.	15.2	2	17.2	19.2	13
Minneapolis, Minn.	12	2	14	14	12.9
Duluth, Minn.	13.5	2	15.5	17.5	12.9
Mankato, Minn.	12.1	2	14.1	16.1	12.7
Des Moines, Ia.	11.9	3	14.9	16.9	12.3
Davenport, Ia.	12.5	3	15.5	17.5	12.3
Sioux City, Ia.	14.1	3	17.1	19.1	11.9
Mason City, Ia.	14.5	3	17.5	19.5	12.3
St. Louis, Mo.	*13.6	2	15.6	17.9	11.3
Kansas City, Mo.	†12.9	2	14.9	16.9	10.6
St. Joseph, Mo.	†12.5	2	14.5	16.5	11.2
Fargo, N. D.	13	2	15	17	14.9
Grand Forks, N. D.	17.2	2	19.2	21.2	15.2
Minot, N. D.	16.9	2	18.9	20.9	14.9
Pierre, S. D.	15.5	4	19.5	21.5	13.9
Huron, S. D.	15.5	4	19.5	21.5	13.9
Wichita, Kans.	10.8	2	12.8	12.8	10.8
Bartlesville, Okla.	12.8	3	15.8	17.8	10.8

S. O. Indiana's quantity discount schedule on tank wagon deliveries of gasoline outside the city of Chicago is 1c for 50 gals. or more at one delivery; 1½c for 6,000 gals. or more a month; 2c for 10,000 gals. or more a month, and 3c for 15,000 gals. or more a month.

In Chicago, above discounts apply, except that minimum required quantity to get the 1c discount is 100 gals., instead of 50 gals. This 1c discount applies on quantities of 100 gals. and over, in addition to regular Q.D.A. discounts applying thru rest of territory, as stated above.

Service station discount is 2c per gal. to consumers of 200 gals. or more a month, or 2400 gals. per year.

Discount on kerosene is 1c on 50 gal. dumps throughout territory.

*Includes city tax of ½c.

†Includes city tax of 1c.

S. O. NEBRASKA

Omaha, Neb.	14.25	2	16.25	16.25	12.25
McCook	12.75	2	14.75	16.75	11.50
Norfolk	14.75	2	16.75	18.75	12.75
North Platte	15.75	2	17.75	19.75	13.50
Scottsbluff	15.25	2	17.25	19.25	13.00

CONTINENTAL OIL

Denver, Colo.	13	3	16	18	12.5
Pueblo, Colo.	13	3	16	18	14.5
Grand Junction, Colo.	17.5	3	20.5	22.5	18
Casper, Wyo.	14	3	17	19	13
Cheyenne, Wyo.	15	3	18	20	14.5
Butte, Mont.	19	3	22	22	19
Helena, Mont.	19.5	3	22.5	24.5	19
Salt Lake City, Utah	16.5	3½	20	21	17
Boise, Ida.	19.5	4	23.5	25.5	19
Twin Falls, Ida.	19.5	4	23.5	25.5	19
Albuquerque, N. M.	16	5	21	24	17

S. O. CALIFORNIA*

Phoenix, Ariz.	19	4	23	27	21.5
Los Angeles, Cal.	13.5	3	16.5	20.5	15.5
Fresno, Cal.	14	3	17	21	16.5
San Francisco, Cal.	14	3	17	21	15.5
Reno, Nev.	18	4	22	26	19
Portland, Ore.	14.5	3	17.5	21.5	16.5
Seattle, Wash.	14.5	2	16.5	20.5	16.5
Spokane, Wash.	18.5	2	20.5	24.5	20.5
Tacoma, Wash.	14.5	2	16.5	20.5	16.5

*On Oct. 1, t.w. price at all points for spot sales, was advanced 1c. Very large portion of deliveries are under contract carrying above prices. New customers signing contracts and selling only one brand of gasoline, are given prices published in above table.

S. O. LOUISIANA

Little Rock, Ark.	11	5	16	16	11
Alexandria, La.	13	2	15	18	†14
Baton Rouge, La.	12	2	14	17	†12.5
Lake Charles, La.	13.5	2	15.5	18.5	†14
New Orleans, La.	13.5	2	*15.5	*18.5	†14
Shreveport, La.	13.5	2	15.5	18.5	†13
Lafayette, La.	13	2	15	18	†13.5
Bristol, Tenn.	16	3	19	22	14
Chattanooga, Tenn.	16.5	3	19.5	22.5	15
Knoxville, Tenn.	16.5	3	19.5	22.5	15
Nashville, Tenn.	15	3	18	21	15
Memphis, Tenn.	12	3	15	16.5	14

*New Orleans gasoline prices include 1c parish tax in addition to 2c state tax, and kerosene prices include 1c state tax and 1c parish tax.

†Kerosene price in Louisiana includes 1c state tax.

S. O. OHIO

	Gasoline Total			Oil
	T.W.	Tax	T.W.	S.S.	T.W
All Ohio points	14	3	17	19	14

MAGNOLIA PETROLEUM

Muskogee, Okla.	12	3	15	18	10
Oklahoma City	10	3	13	14	10
Tulsa, Okla.	10	3	13	14	10
Fort Smith, Ark.*	13	*3	16	19	12
Little Rock, Ark.	11	5	16	16	12
Texarkana, Ark. *	12	*3	15	18	12
Dallas, Tex.	11	3	14	17	11
Fort Worth, Tex.	11	3	14	16	10
Houston, Tex.	10	3	13	15	15
San Antonio, Tex.	10	3	13	15	10
El Paso, Tex.	11	3	14	15	16

*Within City of Texarkana and Fort Smith, the state tax on gasoline is 3c per gal. conforming with the Texas state tax. In these two districts outside of the city the 5c Arkansas tax applies.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M. & P. Naphtha	Cleaner Naphtha
Chicago	16	18	18
Detroit	17.7	19.7	19.7
Kansas City	†16.2	†18.2	†18.2
Milwaukee	16.7	*20.7	*20.7
Minneapolis	*20	*22	*22
St. Louis	15.9	17.9	17.9
New York	...	19	....

*Includes 2c state tax.

†Includes 1c city tax.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

ONTARIO

	Gasoline Total			Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Toronto	19.5	3	22.5	26	21
Ottawa	19.5	3	22.5	26	21
Cochrane	24.5	3	27.5	36	26
Ft. William	24.5	3	27.5	31	23.5

MANITOBA

Winnipeg	24.5	3	27.5	31	23.5

SASKATCHEWAN

Regina	27.5	0	27.5	32	26.5

ALBERTA

Edmonton	26.5	3	29.5	33	25.5
Calgary	22.5	3	25.5	29	23.5

BRITISH COLUMBIA

Vancouver	21	3	24	28	22

QUEBEC

Montreal	20.5	3	23.5	27	21
Quebec City	22.5	3	25.5	31	23
Three Rivers	22.5	3	25.5	30	23

NEW BRUNSWICK

St. John	24.5	3	27.5	32	24
Moncton	24.5	3	27.5	32	24

NOVA SCOTIA

Halifax	24.5	3	27.5	32	24
Sydney	24.5	3	27.5	32	24

PRINCE EDWARD ISLAND

Charlottetown	24.5	3	27.5	31	24

Note: In districts surrounding these points 1c additional is added to city price.

prices in-
state tax.

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Oil

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Gasoline Prices Leveled in East; Jobbers Hold Off Buying

Staff Special
NEW YORK, Dec. 31

EASTERN gasoline markets closed 1927 with a move toward the leveling of prices. The higher prices quoted by some refiners for U. S. Motor gasoline were brought down to the 8.25-cent level held by most sellers in the three largest centers—New York, Philadelphia and Baltimore. A slight recession in prices was noted in some districts to the north and south.

Little activity by jobbers was reported. Refiners have been willing to quote current spot market prices over January. Jobbers, on the other hand, have been reluctant to commit themselves over this period and indicate they will continue hand-to-mouth buying as they have most of the last year.

In former years, the last week in December and the forepart of January have witnessed high interest by the jobbing trade, but this element has been lacking. In accounting for this lack of interest refiners assert it is generally conceded the advancing markets of January and February of former years will not be repeated in 1928 although a slight stiffening in the gasoline market is looked for in some quarters. One refiner pointed out that the logical season for the refiner to store rather than to push sales to any great extent is at hand, and in view of this, distress gasoline which has been more or less the disturbing factor in recent months, will be missing.

The current price range for U. S. Motor gasoline at New York harbor was unchanged. Several sellers offer this grade at 8 cents in tank cars and some ask 8.25 cents.

At Philadelphia and Baltimore, 8.50-cent quotations were reduced 0.25 cent. Several refiners stated they were quoting 8.25 cents over January. U. S. Motor gasoline was still available at 8 cents at Baltimore but 8.25 was the minimum quoted at Philadelphia. Some refiners at Philadelphia who handle both California U. S. Motor and U. S. Motor refined from other crudes reported they were still booking a fair volume of orders at 8.50 cents. One large dealer in California gasoline, however, asserted it was difficult to obtain a premium for this goods over regular U. S. Motor in winter and there was a possibility he might reduce his price to 8.25 cents in the near future.

New England refiners generally quoted 8 cents for U. S. Motor gasoline and reported business exceptionally slow. One refiner indicated he was taking on some business at 7.75 cents but stated the volume of stuff moving at this figure was small in comparison to the total. Another refiner said he had been running into occasional 7.50-cent competition recently but had not been forced to lower his 8-cent price to get what business he needed. A survey of the jobbing trade in New England failed to reveal any purchases at 7.50 cents. A buyer of barge load quantities stated he obtained his last requirements a week ago at 7.75 cents but so far he had been unable to find a price as low as 7.50.

The mild weather which has prevailed over northern part of the seaboard the past week or two, was blamed for the easing off in kerosene prices. Seven-cent water white kerosene appeared in Philadelphia and Baltimore this week, whereas 7.25 cents had been the low for approximately a month or six weeks previously. The trade was generally of the opinion that the next cold snap that comes along will doubtless bring a flurry of kerosene orders and prices will rally quickly.

Prices of burning oils were without material change in most markets. Low gravity fuel was quoted at 4.75 to 5 cents at New York harbor and 4.50 to 4.75 cents in the New England district. Higher gravity domestic fuel was offered freely at 6 cents in the former market and 5.50 to 6 cents in the latter.

The bunker market was unchanged at New York with Grade C $1.35 a barrel. At Philadelphia, one refiner was offering bunkers at $1.15.

Cargo of Gasoline and Kerosene Is Only Buying at the Gulf

Staff Special
NEW YORK, Dec. 31

BUYING continued light in Gulf export markets this week. An inquiry from the foreign subsidiary of a leading United States refiner was the only occasion for interest in the market on this side of the Atlantic. Independent European buyers revealed no interest although it was reported an inquiry might be out next week.

Following the Christmas holidays, the French subsidiary of an independent refiner in this country inquired for a cargo for late January shipment, divided as follows: approximately 28,500 barrels of 64-66, 375 end point gasoline; 6,500 barrels of U. S. Motor gasoline; 23,500 barrels of 44 water white kerosene, and 6,500 barrels of 41-43 prime white kerosene.

The order was closed late this week and peculiar circumstances surrounding the deal forced the seller to take 0.125 cent less for the 64-66, 375 end point goods than the price quoted for this grade by all suppliers recently. A concession to 8.375 cents was made for the 64-66, 375 end point gasoline. U. S. Motor brought 7.25 cents, water white 7 cents, and prime white 6 cents, which prices were in line with what have been accepted generally as the market for over a month past.

The market for heavy oils as well was quiet. There has been virtually no gas oil buying for European accounts at the Gulf for almost two months, but prices have fluctuated little if any. Translucent gas oil, 26-28 gravity, continued to be offered at 4.125 cents by several suppliers; others were asking 4.25 cents for this grade and also offered a higher gravity gas oil at the same price. The latter, however, had a slightly higher cold test specification.

Buyers reported receiving firm offers of Grade C bunker oil in cargo lots at slightly less than $1.00 a barrel.

Exports from Tampico District

Company	October	November
Transcontinental Petroleum Co. (Standard of New Jersey)	503,100	551,447
Pan American Eastern Oil Co.	1,624,491	1,729,299
Mexican Eagle Oil Co. (El Aguila)	649,534	516,894
Cia. Mexicana Holandesa "La Corona"	244,826	381,217
The Texas Co. of Mexico, S. A.	86,895	62,313
Mexican Gulf Oil Co.	.....	61,313
Sinclair Mexican Companies	385,589	395,755
East Coast Oil Co. of Mexico, S. A. (Southern Pacific)	.....	.....
Pierce Oil Corp.	28,551	.....
Mexican Atlas Oil Co.	51,695	51,926
La Espuela Oil Co.	.....	.....
Moctezuma Terminal	.....	51,835
Mexican Oil Products Co.	20,123	.....
New England Fuel Oil Co.	60,829	.....
Panuco Boston Oil Co.	.....	.....
Empire Gas & Fuel Co.	64,410	131,200
Cia. Petrolera Minerva, S. A.	.....	50,000
Totals	3,720,043	3,983,199

Complete Seaboard Market

Export markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets—complete for the years 1924-1925-1926)

Eastern Domestic Market

(Prices for tank car lots, f.o.b. refinery or seaboard terminal, represent majority of quotations and sales.)

	Jan. 3	Dec. 27	Dec. 19
U.S. Motor gasoline, New York harbor	8.00 – 8.25	8.00 – 8.25	8.00 – 8.25
U.S. Motor gasoline, Philadelphia	8.25	8.25 – 8.50	8.25 – 8.50
U.S. Motor gasoline, New England	8.00	8.00 – 8.25	8.00
U.S. Motor gasoline, Baltimore	8.00 – 8.25	8.00 – 8.50	8.00 – 8.50
U.S. Motor gasoline, Norfolk	8.25	8.25 – 8.50	8.25 – 8.50
U.S. Motor gasoline, Wilmington	8.25	8.25	†8.50
U.S. Motor gasoline, Charleston	8.00	8.00	8.00
U.S. Motor gasoline, Savannah	7.75	7.75	7.75
U.S. Motor gasoline, Jacksonville	7.50 – 7.75	7.75	7.75
California U.S. Motor gasoline, Baltimore	8.50	8.50	8.50
California U.S. Motor gasoline, Philadelphia	8.50	8.50	8.50
Water white kerosene, New York harbor	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
Water white kerosene, Philadelphia	7.00 – 7.50	7.25 – 7.50	7.25 – 7.50
Water white kerosene, Baltimore	7.00 – 7.50	7.25 – 7.50	7.25 – 7.50
Water white kerosene, New England	†7.50	†7.50	†7.50
28-34 gas oil, New York harbor	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00
28-34 gas oil, New England	4.50 – 4.75	4.50 – 5.00	4.50 – 5.00
38-42 furnace oil, New York harbor	6.00	6.00	6.00
36-40 furnace oil, New England	5.50 – 6.00	5.50 – 6.00	5.50 – 6.00
Grade C bunker oil, New York harbor	$1.35	$1.35	$1.35
Grade C bunker oil, New England	$1.35 –$1.40	$1.35 –$1.40	$1.40
Diesel oil, New York harbor	$2.10	$2.10	2.10
MEDICINAL OILS			
Russian 885-890 s.g., 325-330 vis.	$0.80 – 0.90	$0.80 – 0.90	$0.80 – 0.90
Russian 870-875 s.g., 150-155 vis.	$0.67 – 0.77	$0.67 – 0.77	$0.67 – 0.77
Russian 860-865 s.g., 80-85 vis.	$0.65 – 0.75	$0.65 – 0.75	$0.65 – 0.75

†Only one refiner quoting.

New York Export Market

(Gasoline and kerosene in cases in bulk. Lubricating oils are per gal. in bbls. Cylinder oils are Penna. products.)

	Jan. 3	Dec. 27	Dec. 19
U. S. Motor gasoline	23.90	23.90	23.90
43-45, 150 w.w. kerosene	18.15	18.15	18.15
42-44, 110 s.w. kerosene	17.15	17.15	17.15
CYLINDER OILS			
Bright stock, dark	35.00 –36.00	35.00 –36.00	35.00 –37.00
600 D filtered	30.00 –31.00	30.00 –31.00	30.00 –31.00
600 Warren E filtered	25.00 –26.00	25.00 –26.00	25.00 –26.00
600 s.r. unfiltered	17.00	17.00	17.00
650 s.r. unfiltered	18.50 –19.00	18.50 –19.00	18.50 –19.00
600 flash s.r.	20.00 –21.00	20.00 –21.00	20.00 –21.00
630 flash s.r.	33.00	33.00	33.00
RED ENGINE OILS (Vis. 100°)			
300 vis. No. 6½ color	20.00	20.00	20.00
250 vis. No. 6 color	19.00	19.00	19.00
200 vis. No. 6 color	18.50	18.50	18.50
PALE ENGINE OILS (Vis. 100°)			
230 vis. No. 3¾ color	24.00	24.00	24.00
180 vis. No. 3¼ color	20.00	20.00	20.00
100 vis. No. 2¼ color	15.75	15.75	15.75
MOTOR OILS (Vis. 100°)			
600 vis. No. 7 color	35.00	35.00	35.00
500 vis. No. 6½ color	33.00	33.00	33.00
400 vis. No. 7¼ color	31.00	31.00	31.00
300 vis. No. 6 color	30.00	30.00	30.00
200 vis. No. 3¼ color	24.00	24.00	24.00
MEDICINAL OILS			
875-885 s.g.	$0.80	$0.80	$0.80
865-870 s.g.	$0.70	$0.70	$0.70

WAXES (In cents per pound, f.a.s. carload lots)

WHITE CRUDE SCALE (In barrels)

	Jan. 3	Dec. 27	Dec. 19
122-124 A.m.p.	2.75 – 3.00	2.75 – 3.00	2.625– 2.75
124-126 A.m.p.	2.75 – 3.00	2.75 – 3.00	2.625– 2.75
FULLY REFINED (In burlap bags)			
123-125 A.m.p. Phila.	3.75	3.70 – 3.75	3.75
125-127 A.m.p.	3.75	3.70 – 3.75	3.75
128-130 A.m.p.	4.00	3.875– 4.00	3.875– 4.12½
130-132 A.m.p.	4.50	4.50	4.375– 4.50
133-135 A.m.p.	*5.00 – 5.50	*5.50	*5.50
135-137 A.m.p.	*5.75 – 6.00	*5.75 – 6.00	*5.75 – 6.00
YELLOW CRUDE SCALE			
124-126 A.m.p.	2.625	2.625	2.62½

***Prices nominal.**

Gulf Export Market

(F.O.B. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. and over, except where otherwise noted.)

GASOLINE	Jan. 3	Dec. 27	Dec. 19
U. S. Motor	7.25	7.00 – 7.25	7.00 – 7.25
60-62, 400 e.p.	*8.00	*8.00	*8.00
61-63, 390 e.p.	8.25	8.25	8.25
64-66, 375 e.p.	8.50	8.50	8.50
U. S. Motor, cases (cargoes)	$1.65	$1.60	$1.60
64-66, cases (cargoes)	$1.80	$1.75	$1.75

***Nominal.**

KEROSENE			
44 water white	7.00	7.00	7.00
41-43 prime white	6.00	6.00	6.00
Water white, cases (cargoes)	$1.60	$1.60	$1.60
Prime white, cases (cargoes)	$1.50	$1.50	$1.50
DOMESTIC GAS & BUNKER OILS			
*26-28 gas oil	4.125– 4.25	4.125– 4.25	4.125– 4.25
*30-32 gas oil	4.25	4.25	4.25
Grade C bunker oil	$1.20 –$1.25	$1.20 –$1.25	$1.20 –$1.25
Grade C bunker oil, cargoes	$1.00	$1.00 –$1.05	$1.00 –$1.05

***Translucent thru neck of 4 oz. bottle.**

MEXICAN CRUDE AND BUNKER OILS (F.O.B. Steamer, Tampico)			
Heavy Panuco crude taxes to be paid	$1.10 –$1.12	$1.10 –$1.12	$1.10 –$1.16
Grade C bunker oil, for bunkering purposes, taxes paid	$1.35	$1.35	$1.35

SOUTH TEXAS LUBRICATING OILS (Viscosity at 100° F.; cold test 0) (Tanker, f.o.b. Houston)

100 vis. No. 2 unfiltered pale	6.00	6.00	6.00
200 vis. No. 3 unfiltered pale	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
300 vis. No. 3 unfiltered pale	9.00 – 9.50	9.00 – 9.50	9.00 – 9.50
500 vis. No. 3½ unfiltered pale	10.50 –11.00	10.50 –11.00	10.50 –11.00
200 vis. No. 5½ red oil	7.00 – 7.50	7.00 – 7.50	7.00 – 7.50
300 vis. No. 5½ red oil	8.25 – 8.50	8.25 – 8.50	8.00 – 8.50
500 vis. No. 6 red oil	9.00 – 9.75	9.00 – 9.75	9.00 – 9.50

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	Jan. 3	Dec. 27	Dec. 19
Gasoline, U. S. Motor, 53-55 Gravity	6.00 – 6.50	6.00 – 6.50	6.00 – 6.50
Gasoline, U. S. Motor, blends and special cuts	7.00 – 8.00	7.00 – 8.00	7.00 – 8.00
Gas Oil, 30-34, per barrel	$1.05 –$1.10	$1.05 –$1.10	$1.05 –$1.10
Diesel Oil, 27 plus, per barrel	$0.95 –$1.05	$0.95 –$1.05	$0.85 –$1.00
Bunker oil, 14-18, per barrel	$0.80 –$1.00	$0.80 –$1.00	$0.80 –$1.00
Fuel oil, 14-18, per barrel	$0.75 –$1.00	$0.75 –$1.00	$0.75 –$1.00
Kerosene, 38-40 w.w., 125-150 flash, per gal.	4.50 – 5.00	4.50 – 5.00	4.50 – 5.00
Cased Goods			
Gasoline, U. S. Motor	$1.65 –$1.75	$1.70 –$1.80	$1.65 –$1.75
Kerosene, 38-40 w.w., 125-150 flash	$1.30 –$1.45	$1.35 –$1.50	$1.30 –$1.45

Dec. 19
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2.625– 2.75

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4.375– 4.50
*5.50
*5.75 – 6.00

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Dec. 19
7.00 – 7.25
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8.25
8.50

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$1.75

7.00
6.00

$1.60

$1.50

4.125– 4.25
4.25
$1.20 –$1.25

$1.00 –$1.05

Tampico)

$1.10 –$1.16

$1.35

; cold test

6.00

8.00 – 8.50

9.00 – 9.50

0.50 –11.00
7.00 – 7.50
8.00 – 8.50
9.00 – 9.50

s, cents

Dec. 19

5.00 – 6.50

7.00 – 8.00
.05 –$1.10

.85 –$1.00

.80 –$1.00
.75 –$1.00

.50 – 5.00

.65 –$1.75

.30 –$1.45

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Crude Oil Prices, as Posted by Major

(Crude prices for years 1924-1925-1926 in

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)

Penna. Grade Oil in New York Transit Lines (Allegheny, N. Y. District)	$2.80
Bradford District Oil in National Transit Lines (Bradford District)	2.80
Penna. Grade Oil in National Transit Lines (Other Pennsylvania)	2.65
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)	2.65
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)	2.60
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)	2.35
Keister Grade in National Transit Lines (Butler Co.)	1.10
Cabell Grade in Eureka Pipe Lines (West Virginia)	1.50
Corning Grade in Buckeye Pipe Lines (Ohio)	1.55
Corning, O. heavy grade	1.45
*Somerset Oil in Cumberland Pipe Lines (Kentucky)	1.60
Ragland Grade in Cumberland Pipe Lines (Kentucky)	.95

*Somerset oil run prior to Oct. 1922, takes price of 6 cents lower than above quotations.

(Posted by Stoll Oil Refining Co.)

Oil City, Ky., oil in Stoll lines	$1.50

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

Effective March 14, 1927

Wooster	$1.57	Plymouth	$1.33
Lima	1.71	West. Kentucky	1.33
Waterloo	1.20	*Canadian Petro.	2.11
Indiana	1.48	*Oil Springs	2.18
Princeton	1.60	*Posted by Imperial Oil Ltd.	
Illinois	1.60		

OKLAHOMA, KANSAS And NORTH TEXAS

Prices of Prairie Oil & Gas Co.

(In Oklahoma, Kansas, North and East Central Texas)

Effective March 12, 1927

18-28.9	$1.12	35-35.9	$1.26
19-29.9	1.14	36-36.9	1.28
30-30.9	1.16	37-37.9	1.30
31-31.9	1.18	38-38.9	1.32
32-32.9	1.20	39-39.9	1.34
33-33.9	1.22	40-40.9	1.36
34-34.9	1.24	41-41.9	1.38
42-42.9	$1.40	48-48.9	$1.52
43-43.9	1.42	49-49.9	1.54
44-44.9	1.44	50-50.9	1.56
45-45.9	1.46	51-51.9	1.58
46-46.9	1.48	52 and above	1.60
47-47.9	1.50		

Above schedule met on March 12, by Gulf, Mid-Continent Pet. Corp., and Empire; by Carter, Humble and The Texas Co. on March 14.

Humble Oil & Refining Co. Prices

(Ranger, North Texas, Mexia, Powell, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)

March 14, same schedule as Prairie in above fields, except these grades posted Nov. 16:

Below 25	$0.90	26-26.9	$1.08
25-25.9	1.06	27-27.9	1.10
Mirando, Tex.			$1.00

Magnolia Petroleum Co.

(In Oklahoma, Kansas and North and East Central Texas)

Effective Sept. 14, Magnolia posted same price schedule as Prairie in above fields, in Panola Co. and Iatan, Tex. district, except that Magnolia is paying $1.05 for all oil below 30 gravity.

Glasscock County	$0.80
Corsicana heavy	$1.00

Carter Oil Co.

(Oklahoma and Kansas)

March 14, same schedule as Prairie.

PANHANDLE, TEXAS

Humble Oil & Refining Co.

Effective Aug. 23

Hutchinson, Carson and Wheeler Counties	$0.75
Pampa, Gray County, Effective March 14:	

28-28.9	$ .80	37-37.9	$ .98
29-29.9	.82	38-38.9	1.00
30-30.9	.84	39-39.9	1.02
31-31.9	.86	40-40.9	1.04
32-32.9	.88	41-41.9	1.06
33-33.9	.90	42-42.9	1.08
34-34.9	.92	43-43.9	1.10
35-35.9	.94	44 and above	1.12
36-36.9	.96		

WEST TEXAS

Humble Oil & Refining Co.

Effective Aug. 23

Crane, Upton, Crockett and Pecos Counties	$0.60

NORTH LOUISIANA — ARKANSAS FIELDS

Prices of Standard Oil Co. of Louisiana Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton and De Soto

Effective March 14, 1927

Below 28	$1.10	40-40 9	$1.36
28-28.9	1.12	41-41 9	1.38
29-29.9	1.14	42-42 9	1.40
30-30.9	1.16	43-43.9	1.42
31-31.9	1.18	44-44.9	1.44
32-32.9	1.20	45-45.9	1.46
33-33.9	1.22	46-46.9	1.48
34-34.9	1.24	47-47.9	1.50
35-35.9	1.26	48-48.9	1.52
36-36.9	1.28	49-49.9	1.54
37-37.9	1.30	50-50.9	1.56
38-38.9	1.32	51-51.9	1.58
39-39.9	1.34	52 and above	1.60

*Smackover, below 24	$0.85
* do 24 and above	1.00
Bellevue	1.25
Cotton Valley	.85
**Urania, La.	.75
†East El Dorado	1.00

**Posted by Louisiana Oil Refining Corp.

†Posted by Magnolia Petroleum Co.

*Smackover prices posted on Nov. 21 by S. O La., Gulf, Shreveport-El Dorado Pipe Line, Atlantic Oil Producing Co. and Magnolia Pet Co.; on Nov 19 by La. Oil Refg. Corp.; on Nov. 23 by The Texas Co.

STEPHENS, ARKANSAS

Atlantic Oil Producing Co. and Louisiana Oil Refining Corp.

Below 28	$1.00	30-30.9	$1.06
28-28.9	1.02	31-31.9	1.08
29-29.9	1.04	32 and above	1.10

GULF COASTAL

Posted by Humble Oil & Refining Co

Effective March 14

Grades A	$1.20	29-29.9	$1.25
Grades B:		30-30.9	1.27
Below 25	1.15	31-31.9	1.29
25-25.9	1.17	32-32.9	1.31
26-26.9	1.19	33-33.9	1.33
27-27.9	1.21	34-34.9	1.35
28-28.9	1.23	35 and above	1.37

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling and Pierce Junction. All other fields are Grades A only.

California Gasoline Improving; Premiums Offered for Crude

Staff Special

LOS ANGELES, Dec. 31

THE gasoline market in California, insofar as the tank car movement is concerned, is showing some strength, but without change in quotations. One refiner said he was selling his gasoline for out of state movement at 7.5 cents or better, but gasoline for this movement can still be bought in small lots at 7 cents. Shipments to points within the state continue to range from 8 cents up.

An estimate was made this week that tank car shipments to points within the state during December averaged between 15 and 18 cars daily from small Independent refineries.

Payment of premiums for crude oil in Los Angeles Basin fields, where the crude is especially attractive to refiners, is becoming general. At least one major pipe line company is offering 5 cents premium this week. Salesmen representing supply concerns, who keep in very close touch with conditions in the fields, report that frequent offers of premiums are reported. In one instance an Independent producer was offered 10 cents premium this week, but was forced to refuse the offer as the producer had already contracted his output.

Fuel oil continues plentiful, with stocks increasing, but major companies with deep water terminals are holding up their quotations. One buyer was seeking a cargo for foreign movement at 75 cents net at harbor. Rumors continue to fly about that contracts of some size can be made at this time, over a period, at figures close to 75 cents. But in spite of this situation, major companies are quoting 80 to 90 cents for spot fuel.

Tankers can be secured at 55 to 60 cents a barrel for dirty bottoms for movement from California ports to East Coast points. Clean boats are obtainable at 5 cents less.

A cargo of kerosene left Los Angeles Harbor last week for New York, being the first shipment of this product to the East Coast in many months. It is understood this cargo went to Standard Oil Co. of New York.

A tone of optimism is appearing in marketing circles, except with reference to fuel oil. It would not be surprising if some of the larger companies stiffened their gasoline quotations after Jan. 1. Gasoline stocks increased in California during 1927, but the net increase has not been sufficient to cause real worry, especially in view of the fact that the production of gasoline in Cali-

Purchasers, in All Fields (in Effect January 2)

OIL PRICE HANDBOOK published annually)

GULF COASTAL
Prices of The Texas Co.
(Effective March 14)

Grades A	$1.20	*Grades B	$1.15
‡Grades B (light crude):			
35-35.9	$1.37	38-38.9	$1.43
36-36.9	1.39	39-39.9	1.45
37-37.9	1.41	40 and above	1.47

*Grades B include all heavy crudes which do not meet tests for Grades A or for Gulf Coast light crude.

‡The Texas Co.'s gravity and price schedule on oil below 35° is same as Humble's postings on Grades B.

ROCKY MOUNTAIN FIELDS
Prices of Ohio Oil Co. and Midwest Refining Co.
(Salt Creek prices effective March 12)

‡Salt Creek	29-29.9	$1.14
" "	30-30.9	1.16
" "	31-31.9	1.18
" "	32-32.9	1.20
" "	33-33.9	1.22
" "	34-34.9	1.24
" "	35-35.9	1.26
" "	36-36.9	1.28
" "	37 and above	1.30
Elk Basin		1.33
Grass Creek light		1.33
Big Muddy		$1.25
Lance Creek		1.33
Rock Creek		1.25
Mule Creek		1.30
Rex Lake		1.10
‡Osage		1.33
‡Cat Creek, Mont.		1.33
Sunburst, Mont.		1.35
‡Hogback, N. Mex.		1.38
Artesia, N. Mex.		1.00

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

The Texas Co. buys Salt Creek and Big Muddy crude.

CALIFORNIA
Standard Oil Co. of California

Santa Maria and Ventura Posted by Union Oil Co.

Gravity	Signal Hill Seal Beach Huntington Beach	Inglewood Torrance	Whittier La Habra	Newhall, McKittrick, Kern River	Olinda-Brea Canon, Richfield	Athens-Rosecrans Dominguez	Montebello	Coyote Hills	Santa Fe Springs	Midway Sunset Buena Vista & Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Santa Maria	Ventura
14-14.9	$ .85	$ .85	$ .85	$ .75	$ .85	....	$ .85	$ .85	....	$ .75	$ .75	$ .75	$ .75	$ .85	$ .85
15-15.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
16-16.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
17-17.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
18-18.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
19-19.9	.85	.85	.85	.75	.85	....	.85	.85	....	.75	.75	.75	.75	.85	.85
20-20.9	.85	.85	.85	....	.85	....	.85	.85	..	.77	.77	.76	.76	.85	.85
21-21.9	.86	.86	.85	....	.86	....	.85	.86	.85	.79	.79	.77	.77	.85	.85
22-22.9	.87	.87	.85	....	.87	....	.85	.87	.85	.81	.81	.78	.78	.85	.85
23-23.9	.88	.88	....	....	.88	....	.85	.88	.85	.83	.83	.79	.79	.85	.85
24-24.9	.89	.89	....	....	.89	$ .89	.85	.89	.85	$ .85	.85	.80	.80	.85	.85
25-25.9	.90	.90	....	....	.90	.90	.86	.90	.86	.87	.87	.81	.81	.86	.86
26-26.9	.92	.92	....	....	.92	.92	.87	.91	.87	.89	.89	.83	.82	.87	.87
27-27.9	.94	.94	....	....	.94	.94	.88	.92	.88	.91	.91	.85	.83	.88	.88
28-28.9	.96	.96	....	....	.96	.96	.89	.93	.89	.93	.93	.87	....	.89	.89
29-29.9	.98	....	....	....	.98	.98	.90	.94	.91	.96	.96	.89	....	.91	.91
30-30.9	1.00	....	....	....	1.00	1.00	.91	.95	.93	.99	.99	.91	....	.93	.93
31-31.9	1.03	....	....	....	....	1.03	....	....	.95	1.02	1.02	.93	....	....	.95
32-32.9	1.06	....	....	....	....	1.06	....	....	.97	1.05	1.05	.95	....	....	.97
33-33.9	....	....	....	....	....	1.09	....	....	.99	1.08	1.08	.97	....	....	.99
34-34.9	....	....	....	....	....	1.12	....	....	1.01	....	1.11	.99	....	....	1.01
35-35.9	....	....	....	....	....	1.15	....	....	1.03	....	....	1.01	....	....	1.03
36-36.9	....	....	....	....	....	1.18	....	....	1.06	....	....	....	....	....	1.06
37-37.9	....	....	....	....	....	1.21	....	....	1.09	....	....	....	....	....	1.09
38-38.9	....	....	....	....	....	1.24	....	....	1.12	....	....	....	....	....	1.12
39-39.9	....	....	....	....	....	1.27	....	....	1.15	....	....	....	....	....	1.15
40-40.9	....	....	....	....	....	1.30	....	....	....	....	....	....	....	....	....
41-41.9	....	....	....	....	....	1.33	....	....	....	....	....	....	....	....	....
42-42.9	....	....	....	....	....	1.36	....	....	....	....	....	....	....	....	....

*Union Oil Co. also purchases Long Beach Crude and is maintaining the same gravity and price schedule in that field as the Standard maintains in Signal Hill and Huntington Beach fields. The Union also buys and pays the same prices as the Standard in the Rosecrans-Dominguez fields, on gravities ranging from 14 degrees to and including 24.9 degrees and in Santa Fe Springs, on gravities ranging from 20 to and including 23.9 degrees.

fornia has greatly increased.

It has been estimated that the consumption of gasoline on the West Coast in 1927 will show an increase of between 18 and 20 per cent. This rate of increase is approximately double the increase in the United States.

* * *

LOS ANGELES, Dec. 30.—A daily average of 117,379 barrels of petroleum products left Los Angeles harbor in 14 tankers during week ended December 24, a decline of more than 45,000 compared with previous week, and less than the average for some weeks. The total movement was 821,654 barrels.

The total movement included 78,571 barrels of crude, 156,559 barrels of gasoline, 10,249 barrels of Diesel, 123,530 barrels of kerosene and 452,745 barrels of fuel. Atlantic domestic drew 75,071 barrels of crude, 97,500 barrels of gasoline and 74,036 barrels of kerosene, while Atlantic foreign only drew 73,117 barrels of fuel. The shipment of Diesel went to Pacific foreign.

Interest Grows in Wax; Prices Move Higher

NEW YORK, Dec. 31.—Wax dealers' ideas of the market in New York varied this week. A renewal of interest from the United Kingdom together with the prospects of more active buying in January stiffened the price situation appreciably in the estimation of a number of brokers, who quoted a minimum of 3 cents a pound for white crude scale, and in some instances as high as 3.125 cents. One refiner said he had received bids of 3 cents a pound for his February output.

On the other hand, several large buyers asserted they had evidenced no pickup that would warrant an advance in the market and cited offers of scale at 2.75 and 2.875 cents they had received from suppliers as representing their ideas of the market.

This week's survey of the market showed a few small lots of white crude scale sold well within the range of prices quoted by both buyers and sellers, namely, 2.75 to 3 cents. Distress lots available a week ago at 2.625 cents could not be found this week.

There was little trading in fully refined waxes reported. Prices of the lower melting point grades were a shade higher while one or two of the higher melting points experienced recessions. The 133-135 A.m.p. fully refined was offered by one supplier at 5 cents a pound this week, but others who had a limited amount of this grade to offer were asking 5.50 cents. Yellow crude scale was still available at 2.625 cents.

The export market for lubricating oils was without material change. A few suppliers reported a slump in prices of steam refined stocks in the field, but asserted this had not been reflected in the export market. Foreign buying continued light. The reason for this, several exporters explained, was that many 1928 contracts were hanging fire.

.....$1.25
..... 1.33
..... 1.25
..... 1.30
..... 1.10
..... 1.33
..... 1.33
..... 1.35
..... 1.38
..... 1.00

Midwest also

Big Muddy

Maria and
Posted by
n Oil Co.

Santa Maria	Ventura
.85	$ .85
.85	.85
.85	.85
.85	.85
.85	.85
.85	.85
.85	.85
.85	.85
.85	.85
.85	.85
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...	.95
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12⅛	
104	
24⅛	
19⅛	
98	
28⅞	
63¾	
250	
...	
13¾	
37	
104⅛	
2⅛	
1⅛	
2⅛	
76½	
78¾	
46	
62	
99¾	
57¾	
1⅞	
27¾	
7	
20¾	
41¾	
31	
112¾	
57¾	
40¾	
31	
114	
28¾	
24⅞	
99¼	
37⅛	
63¾	
46¾	
33¾	
41¾	
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5⅛	
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Transactions in Oil Shares on New York Stock Exchange

1926 High	1926 Low	1927 High	1927 Low		Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Sales	Week Ended Dec. 31 First	High	Low	Last	Change
32⅛	24¼	37⅝	27⅝	(sh)	916,675	N.P.	Amerada Corp.	50cQ	Oct. 30, 27	4,300	31⅛	31⅛	30⅛	30⅛	— 1
74	39⅞	79⅞	35½	(sh)	209,180	N.P.	American Republics	.....	.....	38,700	79	*79⅞	73¼	74⅜	— 4¼
59½	44¾	50¼	38⅝	$	56,000,000	$25	Associated Oil	50cQ	Dec. 24, 27	620	40⅛	41⅞	39	41⅛	+ 1⅞
128⅝	97	131⅝	105¼		50,000,000	100	Atlantic Refining	$1Q	Dec. 15, 27	15,000	109	109	†105¼	107½	— 1½
120	115½	118½	111½		20,000,000	100	do pfd	$1.75Q	Nov. 1, 27	.....	.....	.....	.....	.....	.....
33½	23½	35½	20⅝		25,000,000	25	Barnsdall Corp. A	s62½cQ	Nov. 15, 27	22,000	25¼	25¼	24⅝	25⅛	— ⅛
29½	22½	32½	20½		3,842,400	25	do B	s62½cQ	Nov. 15, 27	400	24¾	24¾	24½	24¾	— ¼
68⅛	29¾	32⅞	20		51,523,950	25	California Petroleum	25cQ	Dec. 1, 27	18,600	23⅝	24⅞	23⅜	24¾	+ ¾
94¼	50	96⅜	65		24,355,000	100	General Asphalt	.....	.....	16,700	81½	82⅞	79⅝	81¼	0
140½	94⅞	144⅞	107¼		6,874,200	100	do pfd	$1.25Q	Dec. 1, 27	100	124½	124½	124½	124½	— 1½
72	50¼	175¾	60⅛		25,000,000	100	Houston Oil	.....	.....	28,100	158½	160⅝	155	156½	— 2¼
84	19⅝	32¾	17⅝	(sh)	500,000	N.P.	Independent Oil & Gas	25cQ	Oct. 31, 27	3,200	25¾	25¾	25	25⅛	— ⅜
13¾	7¼	12⅜	7½	$	3,280,340	$10	Indian Refining	.....	Dec. 15, 20	1,800	9¼	9½	9	9½	+ ¼
12½	8	12	7¼		4,550,110	10	do ctfs	.....	.....	2,500	8⅝	8⅝	8	8½	+ ⅛
104	90	112	99		2,296,400	100	do pfd	.....	Dec. 15, 21	100	103	103	103	103	0
24½	19⅛	36⅞	20⅛	(sh)	3,992,067	N.P.	Lago Oil & Transport	75cQ	Nov. 1, 27	3,600	34⅞	34⅞	34	34⅞	+ ⅜
19⅞	12	18⅜	10	(sh)	1,131,290	N.P.	Louisiana Oil Refining	.....	.....	21,100	10½	10½	10	10½	— ⅛
98	93	97	85¼	$	4,000,000	$100	do pfd	$1⅜Q	Nov. 15, 27	40	90	90¾	90	90¾	+ 2¼
28⅞	16½	22⅜	12	(sh)	330,000	N.P.	Maracaibo Oil	.....	.....	2,700	15¼	16	15¼	16	+ 1
63⅜	49¼	58½	31	(sh)	2,316,401	N.P.	Marland Oil Co.	.....	Mar. 31, 27	62,500	35¼	35½	34	35	— ⅜
250	225	320	200	$	45,942,800	$100	Mexican Petroleum	$3Q	Oct. 20,	220	275	*320	275	320	+73
.....	.....	.....	.....		12,000,000	100	do pfd	$2Q	Oct. 20, 27	.....	.....	.....	.....	.....	.....
13¾	6	9¼	3	(sh)	945,839	N.P.	Mexican Seaboard	.....	Nov. 15, 24	20,200	4⅝	5½	4½	5	+ ½
37	27½	39⅜	25½	(sh)	1,357,800	N.P.	Mid-Continent Petroleum	.....	Aug. 1, 27	27,000	29	29⅜	28	29¼	0
104¼	90	105	97	$	6,718,000	$100	do pfd	$1.75Q	Dec. 1, 27	.....	.....	.....	.....	.....	.....
2½	⅜	3¼	1⅝		24,435,000	10	Middle States	.....	July 1, 23	4,700	2	2¼	2	2¼	+ ⅛
1⅝	½	2½	1⅜		5,356,660	...	do ctfs	.....	.....	1,500	1¼	1⅜	1¼	1¼	— ⅛
2¼	1	1⅝	1	(sh)	3,500,000	N.P.	Pacific Oil	.....	.....	3,200	1⅜	1¼	1⅛	1¼	+ ⅛
76½	56⅛	65⅛	40½	$	48,807,500	$ 50	Pan American P. & T.	$1Q	Oct. 20, 27	10,200	41	44⅜	†40½	43⅜	+ 2⅜
78⅝	56⅛	66⅝	40⅛		121,094,850	50	do B	$1Q	Oct. 20, 27	119,800	41¼	44⅝	†40⅛	43⅛	+ 2⅝
46	30	37⅛	16¾	(sh)	400,000	N.P.	Pan American Western B.	.....	Jan. 30, 27	10,600	20⅛	20⅞	19½	19⅝	— ⅛
62	4½	18⅞	8	(sh)	198,770	N.P.	Panhandle P. & R.	.....	.....	3,200	17¼	17¼	15	16	— 1
99⅜	51	83¾	58¾	$	2,935,200	$100	do pfd	.....	July 2, 23	400	80½	80½	80	80¼	+ ¼
57¼	40	60¼	36½	(sh)	2,406,796	N.P.	Phillips Petroleum	75cQ	Jan. 3, 28	36,300	41¼	41⅜	40½	40½	— ⅞
1⅝	⅛	1⅜	½	$	29,622,925	$ 25	Pierce Oil Corp.	.....	.....	4,600	½	¾	½	⅝	0
27⅜	11½	24	13½		15,000,000	100	do pfd	.....	Feb. 1, 22	2,200	16⅜	19	16½	19	+ 1⅜
7	2¼	5½	2½	(sh)	2,500,000	N.P.	Pierce Petroleum	.....	.....	18,600	3⅜	4¼	3¼	3⅜	+ ⅛
20¾	11	33⅜	16¾	1	37,450,850	$50	Producers & Refiners	.....	Sept. 15, 23	2,500	24⅝	25¾	24	25	— 1⅛
41¾	30¾	50	36⅞		2,845,350	50	do pfd	.....	May 1, 25	120	41¾	43¼	41¾	42½	+ ¾
31	25¼	33⅛	25		75,939,250	25	Pure Oil Co.	37½cQ	Dec. 1, 27	10,100	25⅞	26	25½	25⅞	— ⅛
112¾	106	115½	111¾		13,000,000	100	do 8% pfd	$2Q	Jan. 2, 28	100	112¼	112¼	112¼	112¼	— ½
57⅝	47⅛	58	45	(sh)	616,605	13.40	Royal Dutch, N. Y. shares	$1.80	Aug. 2, 27	2,000	48	48	47¼	47⅝	— ⅛
40⅝	40½	47⅛	41⅜	(sh)	78,389	F2	Shell Transport & T.	$1.45	July 22, 27	.....	.....	.....	.....	.....	.....
31	24	31¾	24⅛	(sh)	10,000,000	N.P.	Shell Union Oil	35cQ	Sept. 30, 27	7,500	25½	25⅞	25¼	25½	— ⅜
114	103	111	107½	$	18,350,400	$100	do pfd	$1½Q	Nov. 15, 27	.....	.....	.....	.....	.....	.....
28⅝	15⅜	25¼	14¼		7,208,080	10	Simms Petroleum	.....	Apr. 1, 27	13,700	24⅛	24⅜	23⅝	23⅝	— ½
24½	16¾	22⅝	15	(sh)	4,501,339	N.P.	Sinclair Consolidated	.....	May 31, 24	93,000	20⅝	21½	20¼	20⅞	— ⅛
99½	90	104½	97	$	16,907,000	$100	do pfd	$2Q	Nov. 15, 27	1,500	102½	102½	102½	102½	— ½
37½	26⅝	37⅜	24⅛		27,396,590	25	Skelly Oil Co.	50cQ	Dec. 15, 27	5,000	27	27¼	26½	27¼	+ ¾
63⅜	52⅝	60¾	50¾	(sh)	13,016,434	N.P.	S. O. California	62½cQ	Dec. 15, 27	9,900	55⅛	56	55	55½	0
46⅝	37⅜	43⅝	35⅛	$	606,243,050	$25	S. O. New Jersey	‡25cQ	Dec. 15, 27	19,800	39¼	40	39⅛	39⅜	— ⅛
33⅛	32½	34⅛	29¾		424,348,275	25	S. O. New York	40cQ	Dec. 15, 27	35,400	31⅝	31⅞	30⅞	31⅛	— ⅝
41⅜	30⅛	34⅞	30	(sh)	1,171,508	N.P.	Sun Oil	‡25cQ	Dec. 15, 27	2,100	32¼	32¼	31⅛	31½	— 1
.....	.....	101⅝	99	$	5,000,000	$100	do pfd	$1.50Q	Dec. 1, 27	200	100	100¼	100	100¼	— ⅜
5¼	1	6½	3⅛	(sh)	1,121,368	N.P.	Superior Oil Corp.	.....	Dec. 20, 20	3,400	3⅛	3½	3⅛	3½	+ ½
57¼	53⅛	58	45	$	180,428,225	25	The Texas Corp.	75cQ	Jan. 1, 28	45,700	52¾	54¼	52⅝	54	+ 1¼
19½	12	18⅞	12		8,380,340	10	Texas Pacific Coal & Oil	15cQ	Jan. 3, 28	5,100	14⅜	14⅝	13¾	14⅛	0
39¼	37	29⅛	19	(sh)	2,168,264	N.P.	Tide Water Oil Co.	20cQ	Dec. 31, 27	900	....	22⅞	22¼	22⅞	— ⅛
103	87¼	90½	85	$	20,705,200	$100	do 5½ pfd	$1.25Q	Nov. 15, 27	700	87	87	86½	86½	— ½
....	....	19⅛	15⅜	(sh)	4,795,934	N.P.	Tide Water Associated	.....	Aug. 1, 27	59,500	17½	17½	16½	17¼	— ⅛
....	....	90¾	85	$	72,795,900	100	do pfd	$1.50Q	Jan. 3, 28	1,800	87½	87½	86½	86½	— 1
5½	3	10¼	3¾	(sh)	3,742,029	N.P.	Transcontinental Oil	.....	.....	83,300	9	9⅛	8¾	8¾	— ¼
58⅜	37¼	56½	39⅜	$	40,759,475	$25	Union Oil of California	50cQ	Nov. 10,27	14,700	44¼	44¼	43¼	43⅜	— ⅛
120⅜	84¼	123½	94		30,734,000	100	Union Tank Car Co.	$1.25Q	Dec. 1, 27	.....	.....	.....	.....	.....	.....
....	....	34½	24½	(sh)	240,000	N.P.	Warner Quinlan	50cQ	Jan. 3, 28	4,800	31¼	31⅜	30⅝	31¼	— ½
29¾	25⅛	27½	20	(sh)	490,000	N.P.	White Eagle Oil & Refining	50cQ	Oct. 20, 27	800	20½	21	†20	20¼	— ⅜

*New High †New Low xEx-Dividend ‡Also extras s-Stock Total Sales 928,400

Cleveland Stock Market

December 30

	Par Value	Bid	Asked	Last Sale
Canfield Oil Co.	100	...	...	...
do pfd.	100	x100	...	100
Fred G. Clark	10	2	3½	2
National Refining Co.	25	35½	37½	37½
do pfd.	100	x130	...	130½
Paragon Refining Co.	25	9½	10	9½
do pfd.	100	103	105½	107½

x Ex-Dividend

Beacon Oil Co.—H. B. Clark of the investment banking house of White Weld & Co. has been elected a director.

South Western Pennsylvania Pipe Lines—Annual meeting has been called for Jan. 25 at Oil City, Pa.

Pandem Oil Corp.—J. W. Campbell, John Gaston, and George Kern have been elected directors.

PITTSBURGH STOCK EXCHANGE

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Sales	Week Ended Dec. 30 First	High	Low	Last	Ch'ge
8½	5¾	9⅞	6⅞	$ 10	Arkansas Nat. Gas.	1,285	8⅛	8⅜	8⅜	8⅞	+ ⅛
90½	79¾	98⅝	80⅞	100	Columbia Gas	.....	.....	.....	.....	.....	.....
101⅜	95	107⅛	100	100	do pfd	.....	.....	.....	.....	.....	.....
17	12½	15	7½	10	Devonian Oil	80	8	8	7½	7½	— ½
116½	112	117½	115	100	Duquesne Lt. 7% pfd.	37	115	115	115	115	0
10	5⅛	12¼	6	N.P.	Houston Gulf Gas.	350	12	12⅛	12	12	0
46	39	59¼	37¼	$25	Lone Star Gas	1,146	54	54	53½	54	+ ½
47⅛	33⅛	22¼	22¼	25	Ohio Fuel Corp.	.....	.....	.....	.....	.....	.....
47½	42	21¾	21	...	do ctfs	.....	.....	.....	.....	.....	.....
6¾	5	6	5	...	Ohio Oil & Gas	.....	.....	.....	.....	.....	.....
34	21	21	21	25	Oklahoma Nat. Gas.	.....	.....	.....	.....	.....	.....
21	19¼	23¾	20¼	...	do ctfs	.....	.....	.....	.....	.....	.....
5⅜	3⅛	3⅞	3	5	Pittsburgh Oil & Gas	205	3¼	3½	3¼	3½	— ⅜
10	7½	8	5½	10	Salt Creek Cons.	.....	.....	.....	.....	.....	.....
27	8	26½	17	10	Tidal Osage	.....	.....	.....	.....	.....	.....
45	40	43	33	N.P.	Waverly Oil Wks. "A"	.....	.....	.....	.....	.....	.....

PITTSBURGH CURB EXCHANGE

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Sales	Week Ended Dec. 30 First	High	Low	Last	Ch'ge
3⅜	2½	3½	2¾	$ 5	Columbia Synd.	.....	.....	.....	.....	.....	.....
20	.06	.18	.18	5	Duquesne Oil	.....	.....	.....	.....	.....	.....
91½	85	95	88	25	Gulf Oil Corp.	.....	.....	.....	.....	.....	.....
79	79	105	93	100	Houston Gulf Gas pfd.	.....	.....	.....	.....	.....	.....
12	7½	10¾	5½	N.P.	Leonard Oil & Dev.	.....	.....	.....	.....	.....	.....
30¼	29	32	31¼	$ 25	Oklahoma Gas	.....	.....	.....	.....	.....	.....
2	.15	2.70	.30	10	Omar Oil & Gas	3,700	.50	.50	.50	.50	— .05
....	....	9⅞	9⅞	....	Penn. Oil & Gas	.....	.....	.....	.....	.....	.....
....	....	2¼	1¾	....	Pittsburgh Oil Dev.	.....	.....	.....	.....	.....	.....
2	1¼	2¼	2¼	5	do pfd	.....	.....	.....	.....	.....	.....
33½	20	31	19	10	Plymouth Oil	25	20⅛	20⅛	20⅛	20⅛	— ⅛
7	3	6	5	5	States Oil	.....	.....	.....	.....	.....	.....
3½	2	3⅛	1½	1	Texon Oil & Land	9,345	2⅞	3	2⅞	3	0
25¾	8	23¾	18	10	Tidal Osage (non-vtg).	.....	.....	.....	.....	.....	.....

*New high †New Low xEx-Dividend

Standard Oil Stock Traded in New York

1926 High	1926 Low	1927 High	1927 Low	Outstanding Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended Dec. 31 Sales	First	High	Low	Last	Change
21	16¾	21⅝	17⅝	£ 4,000,000	£1	Anglo-American Oil	60⅓c	May 31, 27	500	19¼	19¼	18½	18½	— ¾
20¼	16½	20½	17⅝	.....	£1	do ctfs. non-voting	.....	.....	300	19	19	19	19	+ ⅝
2¾	.75	3⅝	.75	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	1,200	1¼	1⅞	1¼	1⅞	+ ⅝
5	2¾	6½	2½	$ 000,000	$ 10	do pfd.	.....	.....	300	3	3¾	3	3½	0
75	65	69	50	1,000,000	25	Borne Scrymser	‡$18.S.A.	Oct. 15, 27	.....	.....	.....	.....	.....	.....
59½	42	60	45	10,000,000	50	Buckeye Pipe Line	$1Q	Dec. 15, 27	200	57½	57½	57¼	57½	+ ⅜
82½	65	126	76½	3,000,000	25	Chesebrough Mfg.	$1Q	Dec. 28, 27	.....	.....	.....	.....	.....	.....
25⅞	17½	22¾	16¼	38,805,260	10	Continental Oil	25cQ	Dec. 15, 27	.....	.....	.....	.....	.....	.....
137	102	137	89	3,000,000	100	Cumberland Pipe Line	$2Q	Dec. 15, 27	50	92¾	92¾	92¾	92¾	+ 2¾
63¾	43	68½	47	5,000,000	100	Eureka Pipe Line	$1Q	Nov. 1, 27	150	64½	64½	64½	64½	— 2½
32½	9¾	13½	3¾	16,000,000	100	Galena Signal Oil	.....	June 30, 25	600	4⅛	4⅛	3¾	4	— ⅛
94½	35	59⅝	23	4,000,000	100	do new pfd	.....	June 30, 26	290	25¼	26	23	25	— 2¼
97½	40	60⅜	36	2,000,000	100	do old pfd	.....	June 30, 26	220	37¼	37⅝	36¼	36¼	— 1
99¾	52	68½	54	73,117,577	25	Humble Oil & Refining	‡30cQ	Jan. 1, 28	10,200	66⅞	68	66½	67¼	+ ½
144½	125¾	182	123¾	20,000,000	100	Illinois Pipe Line	$6S.A.	Dec. 15, 27	400	178	178	172¼	174	— ¼
39¾	32½	64¾	37¾	(sh) 6,491,952	N.P.	Imperial of Canada	‡25cQ	Dec. 1, 27	2,100	59½	59¾	58¾	59¾	+ ¾
70	54¾	94½	61	$ 5,000,000	$50	Indiana Pipe Line	‡$1Q	Nov. 15, 27	.....	.....	.....	.....	.....	.....
35¼	28½	39	28	(sh) 7,118,138	N.P.	International Petroleum	25c	Nov. 15, 27	12,900	37	37¼	36¾	37	0
20⅝	12½	24	13⅛	$ 6,362,500	$12½	National Transit Co	25cQ	Dec. 15, 27	1,000	20½	21	20½	20½	— ½
51½	27⅜	44⅛	31¼	5,000,000	100	New York Transit	.....	July 15, 26	20	38¼	38¼	38¼	38¼	— ¼
80½	64	100	70	4,000,000	100	Northern Pipe Line	‡$3S.A.	Jan. 1, 28	250	92	93	92	93	+ 3
67⅝	55¾	67¾	52	60,000,000	25	Ohio Oil Co	‡50cQ	Dec. 15, 27	3,800	65¼	66	65¼	65⅞	+ ¾
24⅝	15	39	12	10,000,000	25	Penn Mex. Fuel	.....	May 21, 25	2,900	36	38⅛	35¼	37½	— 1½
60¼	48	55¾	45⅜	60,000,000	25	Prairie Oil & Gas	.....	Aug. 31, 27	7,200	49¾	49¾	48⅝	49	— 1
137½	122¼	190	132	81,000,000	100	Prairie Pipe Line	$2.50Q	Oct. 31, 27	750	187	188½	185½	186½	— 1½
220	184½	201¼	175⅛	4,000,000	100	Solar Refining	$5S.A.	Dec. 20, 27	10	178	178	178	178	0
27	21	27¾	15½	5,000,000	50	Southern Pipe Line	$2	Dec. 1, 27	500	20½	21	20	20	— 1½
50	34¼	41¾	34½	20,000,000	25	South Penn Oil	50cQ	Dec. 31, 27	400	38	38¼	38	38	+ ⅛
57	49	111¾	111¾	3,500,000	100	South West Pa. Pipe Lines	‡$1Q	Dec. 31, 27	.....	.....	.....	.....	.....	.....
70½	60¼	81½	64¾	228,415,463	25	S. O. Indiana	‡62½cQ	Dec. 15, 27	4,100	78¾	78⅞	77⅝	78	— ¾
36½	16½	20⅞	14⅝	8,000,000	25	S. O. Kansas	.....	June 16, 24	1,700	14⅝	15⅛	14⅝	14¾	0
134¾	108	130	111¾	17,012,599	25	S. O. Kentucky	$1Q	Dec. 31, 27	4,000	122	129½	122	125¾	+ 2¼
51¾	42	49¼	40	4,559,850	25	S. O. Nebraska	62cQ	Dec. 20, 27	300	40⅞	42	40⅞	42	+ ¼
672	288	863¼	73	14,000,000	25	S. O. Ohio	62½cQ	Jan. 2, 28	950	78½	79¼	78½	79¼	+ ¾
120¾	116½	122	117¼	7,000,000	100	do pfd	$1.75Q	Dec. 1, 27	30	120¼	120¼	120¼	120¼	0
23	15½	21	14½	861,466	25	Swan Finch Co	.....	Nov. 1, 19	.....	.....	.....	.....	.....	.....
109¾	90¾	149⅞	95⅛	62,470,800	25	Vacuum Oil	‡50cQ	Dec. 20, 27	4,400	141¼	141½	138¼	140½	+ 1⅜

*New high †New low xEx dividend ‡Also extras.

New York Curb Bonds

Week Ending Dec. 30

	High	Low	Last	Ch'ge
Beacon Oil 6s '36	102⅛	101½	101½	— ¾
Cities Service 5s '66	91	90¾	90¾	— ¼
Cities Service 6s '66	103¼	103	103⅛	0
Cities Service G 5½s '42	95⅜	95	95⅛	— ¼
Empire Oil 5½s '42	93⅜	92⅝	92⅞	— ½
Galena Oil 7s '30	88	87	87¾	—1¼
Gulf Oil 5s '37	101¼	101	101⅛	— ⅜
Independent Oil 6s '39	96⅝	96	96⅜	+ ⅜
Richfield Oil 6s '41	97¾	97½	97¾	0
S. O. of N. Y. 6½s '33	104	103⅝	103¾	— ¼
Sun Oil 5½s '39	102	101½	101½	— ½
Valvoline 7s '37	106	106	106	0
Warner-Quin. 6s '42	100¾	100½	100¾	— ¼

New York Bonds

Week Ending Dec. 30

	High	Low	Last	Ch'ge
Amer. Rep. deb. 6s	102⅜	102	102⅜	+ ⅜
Assoc. Oil gold 6s	103	102¾	103	— ¼
Atlantic Refg. deb. 5s	102½	102¼	102½	0
Barnsdall Corp. 6s	100¾	100	100	— ¼
Barnsdall Corp. 6s ex-war.	90⅛	89¼	90	+1
Cal. Pet. 5s	96	95⅝	96	+ ⅞
Cal. Pet. 5½s	100⅜	100	100⅜	+ ⅜
Empire Gas & Fuel 7s	.....	.....	.....	.....
General Pet. 5s	102⅛	102	102⅛	— ¼
Humble Oil & Refg. 5½s	102¾	102⅝	102⅝	0
Humble Oil 5s	100¼	100	100¼	0
Mid-Cont. Pet. 6½s	105½	104¾	104¾	— ¼
Pan Amer. P & T 7s	105½	105½	105½	+ ¼
Pan Amer. P & T 6s	103¼	102⅞	102⅞	0
Pan Amer. P & T 6s	93½	93	93¼	— ⅜
Prod. & Refiners 6s	111½	111½	111½	0
Simms Pet. cvt. 6s	108	107	107	—1¼
Sinclair Con. Oil col 7s	100¼	99⅞	100	0
Sinclair Con Oil con 6½s	97⅛	97	97⅜	+ ⅜
Sinclair Con Oil 6s D	97½	97	97	0
Sinclair Crude Oil 6s	100⅛	100	100	— ⅛
Sinclair Pipeline 5s	94	92¾	94	+ ½
Skelly Oil 5½s	95¼	94⅜	95	— ⅛
S. O. of N. Y. 4½s	97⅝	97⅛	97⅝	+ ⅛
S. O. of N. J. deb. 5s	103¾	103¼	103½	+ ¼
Superior Oil 7s	101⅞	101⅞	101⅞	0
Union Oil of Calif. 6s A	109½	109¼	109¼	— ¼
Union Oil of Cal. 1st 5s	102	102	102	+ ¼
Union Oil of Cal. 5s-C	99⅞	99¼	99⅞	— ⅝
White Eagle 5 ½s	94½	94¼	94½	0

New York Curb Market

1926 High	1926 Low	1927 High	1927 Low	Par Value	Stocks	Transactions Week Ended Dec. 31 Sales	First	High	Low	Last	Change
6¾	45	2⅞	.55	$5	Amer. Con. Oilfields	161,000	1	1⅛	.97	1⅛	— 1⅛
14½	4	7½	2¾	N.P.	Amer. Maracaibo	10,600	2⅞	3⅛	2¾	3⅛	+ ⅛
8⅛	5¾	9¾	6¾	$10	Arkansas Nat. Gas	100	8¾	8¾	8¾	8¾	0
20⅛	14⅛	20½	15½	N.P.	Beacon Oil	.....	.....	.....	.....	.....	.....
85¼	60	49	20½	N.P.	British American	500	37½	38	37	38	+ 1⅜
28⅜	9¼	28¼	14⅜	25c	Carib Syndicate(new)	1,200	19⅞	19⅞	18⅛	19	— 1⅛
.....	.....	26	16½	...	do ctfs. of deposit	.....	.....	.....	.....	.....	.....
51	37½	58¾	40¼	$20	Cities Service	29,000	54⅝	55⅞	54⅝	55¾	+ ½
92½	82¾	95⅜	87	100	do pfd	1,100	94⅞	95	94⅝	94¾	— ¼
8⅜	7⅜	8⅞	7¾	10	do pfd. B	100	8⅞	8⅞	8⅞	8⅞	0
25¼	19	29¼	22½	10	do banker's shares	.....	.....	.....	.....	.....	.....
3½	1¾	3¼	1⅛	$1	Colombia Syndicate	49,900	1⅜	1⅛	1⅛	1⅛	+ ⅜
10⅛	8⅛	9½	6¾	10	Consolidated Royal	200	6⅝	7	6⅝	7	+ ⅝
16	10	14⅞	9½	N.P.	Creole Syndicate	21,500	10	10	9⅞	10	0
7⅜	1⅛	3	.50	N.P.	Crown Central	1,500	80	80	75	76	— 4
8½	½	12	4	...	Darby Petroleum	900	8	8	7¼	7¼	— ¾
.....	.....	11½	5	...	do trust ctfs.	.....	.....	.....	.....	.....	.....
4	1¾	2½	75	N.P.	Derby Oil & Refining	.....	.....	.....	.....	.....	.....
19	13	16¾	6⅛	N.P.	do pfd	.....	.....	.....	.....	.....	.....
7½	2½	3¾	1	N.P.	Gibson Oil	5,200	1⅞	1⅞	1⅝	1⅞	0
2	.63	1⅝	.40	N.P.	Gilliland ctfs.	200	55	55	55	55	0
98	82	117½	86¼	$25	Gulf Oil Corp.	12,300	114½	117½	110½	116¾	+ 2¾
3⅜	1	2¼	1⅛	N.P.	Kirby Petroleum	.....	.....	.....	.....	.....	.....
12¼	5¾	10⅞	5⅛	N.P.	Leonard Oil & Dev.	61,900	5⅝	6½	5½	6¼	+ ¾
27	20	27½	20	N.P.	Lion Oil & Refg.	.....	.....	.....	.....	.....	.....
46	31	59⅜	37	$25	Lone Star Gas	1,500	54	54½	54	54½	+ ½
2⅜	2	2⅞	.87	1	Magdalena Synd.	24,700	1⅜	1⅞	1⅜	1⅝	+ ⅛
5½	1⅞	3	1½	10	Mexican-Panuco	.....	.....	.....	.....	.....	.....
1¾	1¼	1½	1	1	Mountain & Gulf	1,500	1¼	1⅜	1¼	1⅜	0
26	23	29¼	22¾	10	Mountain Producers	25,500	28⅝	29¼	28⅜	28⅝	— ⅜
6¾	5	5⅞	4⅝	5	New Bradford	1,800	5¾	5¾	5⅜	5⅝	— ½
11¾	2	6¼	4	10	New England Fuel	400	4¾	4¾	4½	4½	— ¼
17	9⅛	16	9¼	1	New Mex. & Ariz.	800	9¾	9¾	9⅝	9⅝	0
17	8	13⅞	9	25	New York Oil	1,100	12⅞	13⅞	12⅞	13½	+ 1
12½	8¾	12⅝	10	N.P.	North Cent. Texas	200	11	11	10⅞	10⅞	— ⅛
44¾	33	.....	.....	$25	Ohio Fuel Corp.	.....	.....	.....	.....	.....	.....
33	28½	27½	21¼	...	Okla. Nat. Gas ctfs.	.....	.....	.....	.....	.....	.....
10⅛	5⅞	9⅜	1¾	N.P.	Pandem	6,000	5	5	4⅜	4⅝	— ½
12¼	11¾	12½	7	N.P.	Pantapec Oil	.....	.....	.....	.....	.....	.....
2¾	.20	.37	.25	N.P.	Peer Oil Corp.	.....	.....	.....	.....	.....	.....
22¾	12	13⅛	5⅛	$10	Pennok Oil	1,900	5½	5¾	5½	5⅝	+ ⅛
38	14⅛	24⅜	7	25	Red Bank Oil	.....	.....	.....	.....	.....	.....
30¼	12	15½	2	N.P.	Reiter-Foster	5,500	5¾	5¾	4	5	— 1
27½	22	29⅜	15	$25	Richfield Oil	.....	.....	.....	.....	.....	.....
7½	4½	7	4½	N.P.	Ryan Consolidated	500	4¾	4⅞	4¾	4¾	— ¼
10	7½	8	6	$10	Salt Creek Cons.	5,200	6¾	7⅛	6¾	7	+ ¼
36	26⅞	35½	27¼	10	Salt Creek Prod.	10,640	34⅜	35½	34⅜	34½	— ¼
4⅜	1⅛	7	1¼	5	Savoy Oil	600	2	?	1¼	1¼	— ¾
27	7⅝	26⅛	17	10	Tidal Osage	6,700	20¼	20½	20	20⅜	0
25¾	7⅞	23¾	15	10	do non-voting	2,300	18¼	18¼	17¾	17⅞	— ⅝
...	•	92	63½	100	Transcontinental pfd.	300	88	88	82	82	— 8
3	4⅛	7⅜	4¼	5	Venezuelan Petrol	4,400	5⅛	5⅛	4¾	5	— ⅛
31½	22	32⅜	20⅝	N.P.	Wilcox Oil & Gas	600	22½	22½	21	21	— ½
9½	4⅝	8	4¾	$1	Woodley Petroleum	.....	.....	.....	.....	.....	.....

• New High †New Low xEx Dividend

	Dec. 31 Change
	— 3/4
	+ 3/8
	+ 5/8
	0
	.....
	+ 3/8
	.....
	.....
	+ 2 3/4
	— 2 1/2
	— 1/2
	— 2 1/4
	— 1
	+ 1/2
	— 1/4
	+ 3/4
	.....
	0
	— 1/4
	— 1/4
	+ 3
	+ 3/4
	— 1 1/2
	— 1
	— 1 1/2
	0
	— 1 1/2
	+ 1/8
	.....
	— 3/4
	0
	+ 2 1/4
	+ 1/4
	+ 3/4
	0
	.....
	+ 1 3/8

	Dec. 31 Change
	— 1 1/8
	+ 1/8
	0
	.....
	+ 1 3/8
	— 1 1/8
	.....
	+ 1/2
	— 1/4
	0
	.....
	+ 3/8
	+ 5/8
	0
	— 4
	— 3/4
	.....
	.....
	.....
	0
	0
	+ 2 3/4
	.....
	+ 3/4
	.....
	+ 1/2
	+ 1/8
	.....
	0
	— 3/8
	— 1/2
	— 1/4
	0
	+ 1
	— 1/8
	.....
	.....
	— 1/2
	.....
	.....
	+ 1/8
	.....
	— 1
	.....
	— 1/8
	+ 1/4
	— 1/4
	— 3/4
	0
	— 5/8
	— 8
	— 1/8
	— 1/2
	.....

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